

The Iron Age

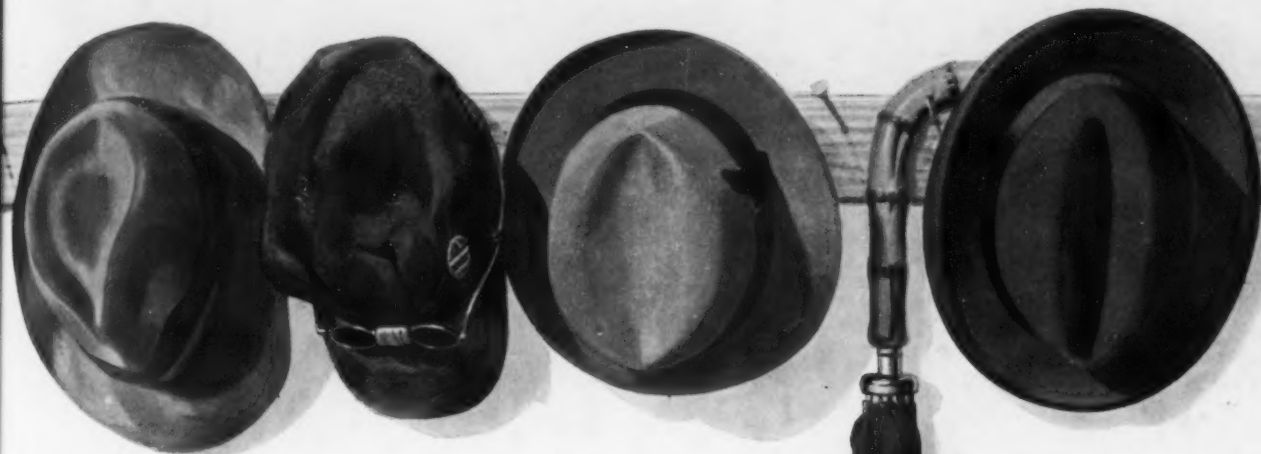
A CHILTON

PUBLICATION

NATIONAL METALWORKING WEEKLY

September 11, 1952

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UNIV. OF MICHIGAN
SEP 11 1952
EAST ENGINEERING
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When a steel order goes through a mill, customers have a big advantage when everyone concerned with production decisions is handy and available. Inland's size and location mean that prompt personal attention can be given to every customer's problem as it comes up.

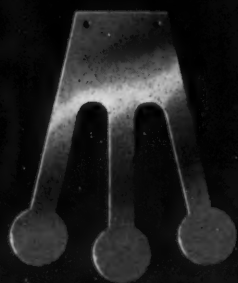
INLAND STEEL COMPANY

38 South Dearborn Street, Chicago 3, Illinois

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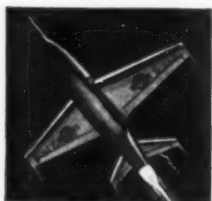
How Much is a Good Spring Worth?



Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.



Valves faced with Alloy 717 stand up under high temperatures and the corrosive action of hot exhaust gases.



Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.

Springs are rather commonplace things . . . used in all sorts of products to perform all sorts of functions. So taken-for-granted are they, in fact, that the only time you really appreciate their worth (or lack of worth) is when they fail to do the job they're supposed to do.

And that's where Hoskins Alloy 769 really comes into its own. Because here is a *special* alloy that possesses some *very special* spring characteristics. For example, it's highly resistant to atmospheric and chemical corrosion. It has exceptional resistance to set and fatigue, which enables it to provide more constant delivery of torque over longer periods of time than ordinary spring material. It's non-magnetic, hard, and strong. Yet it can be cold-formed, heat-treated under controlled conditions, and welded, sold-

ered, or brazed. What's more, it retains its desirable spring properties from sub-zero temperatures up to about 750° F.

Alloy 769 is only one of several special purpose alloys produced by Hoskins. Among the others: the Chromel-Alumel thermocouple alloys . . . unconditionally guaranteed to register true temperature-e.m.f. values within close specified limits. Alloy 717 . . . for facing engine valves; Alloy 502 . . . widely used for heat resistant mechanical applications. Plus special spark plug electrode alloys which have long been the accepted standards for quality and durability. And, of course, there is Hoskins Chromel . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products for home and industry.

HOSKINS

MANUFACTURING COMPANY

4445 LAWTON AVENUE • DETROIT 8, MICHIGAN



Good Steel

Good Blank

Good Gear

No gear is any better than the blank from which it's made. If you start with a blank that's sturdy from rim to hub, one that contains high-quality steel, many production problems are licked at the outset.

Bethlehem blanks have everything you need in the making of a good, tough gear. These heavy-duty products are of clean, sound steel of uniform density.

The blanks are not just rolled, not just forged, but *both*. Rolling and forging are combined in a single operation—one that shapes the hot blocks of steel and helps make the metal compact and homogeneous.

Blanks so processed are very strong; in fact, this advantage often makes possible the use of lighter sections. Another thing—the grain structure is excellent. That's a point your machinist will appreciate. Whether his cut is shallow or deep, he'll find the going easy. No hidden trouble down beneath.

Try some of these highly-dependable blanks when making spur, bevel, miter, and other types of gears. They are furnished untreated or heat-treated, in sizes ranging from 10 to 42 in. OD.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM ROLLED-AND-FORGED CIRCULAR PRODUCTS

The Iron Age—DIGEST

Vol. 170, No. 10

September 11, 1952

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THE IRON AGE, published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 3, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. \$8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, \$15; other Foreign Countries, \$25 per year. Single copies, 35c. Annual Review and Metal Industry Facts Issue, \$2.00. Cables: "Ironage," N.Y.

NEWS DEVELOPMENTS

FAIRER WINDS FOR WEST COAST SHIPBUILDING—P. 85

Revival of West Coast shipbuilding depends on whether Washington keeps its pledges of hefty contracts to come. Western yards are being thrust more deeply into warship conversion, building. The first atomic aircraft carrier may be built on the Coast. Yards in this area battle many cast handicaps.

MAY ANNOUNCE THIRD ROUND ALUMINUM GOAL—P. 87

Productive capacity rising rapidly but new stockpile aims plus military needs slow the softening. Planners expected to aim for 250,000 to 300,000 tons a year more. Still seek new producers—Olin Industries and Kennecott head the list. Power shortage in the Northwest is cutting output again this year.

DEMAND FOR SKILLED WORKERS BUILDING UP—P. 93

Industry is looking harder and wider for skilled workers today. Latest government study shows that engineers, draftsmen, tool makers, die sinkers and setters are high on the shortage list. There are more than 19,000 job openings on record for skilled men. Nearly every state has called for more machinists.

WIRE WHEELS FOR AUTOS STAGE COMEBACK—P. 102

A relic of earlier days of motoring, wire spoke wheels are beginning to roll back on the highways. Success of sportier car stylings demonstrated a sleeping demand for them, and they will be optional equipment on several '53 models. There are sound engineering reasons for using them on heavier type cars too.

DPA RENEWS FIGHT FOR U. S. DEFENSE PLANTS—P. 107

The new Congress will be asked to consider a new bid for federal authority to build and perhaps run war plants. Defeated in previous tries to get the right to enter virtually any type of defense production, the Administration will try for strictly military plants. Exact type of plants was not yet disclosed.

TOOLBUILDERS EXPECT MORE STRETCH-OUTS—P. 113

John R. Steelman's recent report to the President that defense deliveries are reaching a peak has increased machine tool makers' uncertainty about the future. They expect stretch-outs on defense orders, but wish they knew more about the military's needs. This would let NPA revise M-41 for more civilian sales.

EST of the WEEK in metalworking

ENGINEERING & PRODUCTION

HOW GOOD IS THE CHARPY IMPACT TEST?—P. 143

To determine reliability of the Charpy test, one strength level of steels of uniform microstructure was tested. Steels of 150,000 to 160,000 psi yield strength, having impact strength of 20 to 30 ft-lb when tested at -40°F produce a variation of 1.8 or 3.5 ft-lb. Within these limits Charpy test is reliable.

FERROMAGNETISM, HOW, WHERE IT WORKS—P. 148

Electric generators and motors, lifting magnets, solenoids in switches and valves and permanent magnets are but a few of the applications of the principles of ferromagnetism in industry. A knowledge of principals involved in ferromagnetism is helpful in understanding equipment which makes use of them.

A GOOD INCENTIVE PLAN CAN RAISE OUTPUT—P. 153

The right incentive plan offers a higher rate of production, permits an increase in take home pay and cuts unit manufacturing costs. It can bring about orderly operation and create new thinking in the minds of management and labor. It may lead to greater efficiency by bringing out new ideas.

AUTOMATIC EQUIPMENT MORE EFFICIENT—P. 156

Production of 50 cylinder heads per hr at 75 pct efficiency is achieved at Willys-Overland plant with automatic transfer equipment. Line is set up to handle heads of three different compression ratios. Mechanical inspections prevent damage to machines and fixtures, cut rejects and control quality.

BEARING MAY BE MADE OF ANY MATERIAL—P. 158

A fluid piston type bearing for pumps does not have to be made of bearing materials or lubricated with oil or grease. But horsepower requirements are high. Primary use is for pumps that have to be lubricated by the liquid being pumped. Bearing surface doesn't have to be particularly smooth.

NEXT WEEK—NEW PRODUCT PRODUCTION SPEEDED

Getting new products into production becomes more difficult and costly each year. Production problems become harder to visualize in advance. Plastic prototypes, rapidly made from inexpensive wooden models and three dimensional perspective drawings cut costs and make visualization easier.

MARKETS & PRICES

WHEN WILL CONVERSION WITHER ON VINE?—P. 89

Conversion shows signs of an early fall frost. A slipoff after November is predicted. Some popular items such as plates, bars and hot-rolled sheets will carry into '53. Cost of this shortage process of buying steel from one mill for finishing at another will help smother it. Steel imports are competition.

MORE ORDERS, HIGH COSTS, PROFITS SQUEEZE—P. 91

Stronger buying in August closed the gap between new orders and outgoing production for the first time since March 1951. Part of this good news is based on orders increasing because the steel strike ended, because of the seasonal pickup and the end of vacations, shutdowns. Prices are on the upswing again.

EUROPE'S STEEL EXPORT PRICES TAKE A DIP—P. 92

While domestic prices of European steel are rising, export prices took a sudden slide. This points up the battle Schuman Plan member countries are putting up to fatten their export position. They will need all the export strength they can muster when export quotas are awarded under the steel production plan.

STEEL GROOMING SALESMEN FOR NEXT YEAR—P. 199

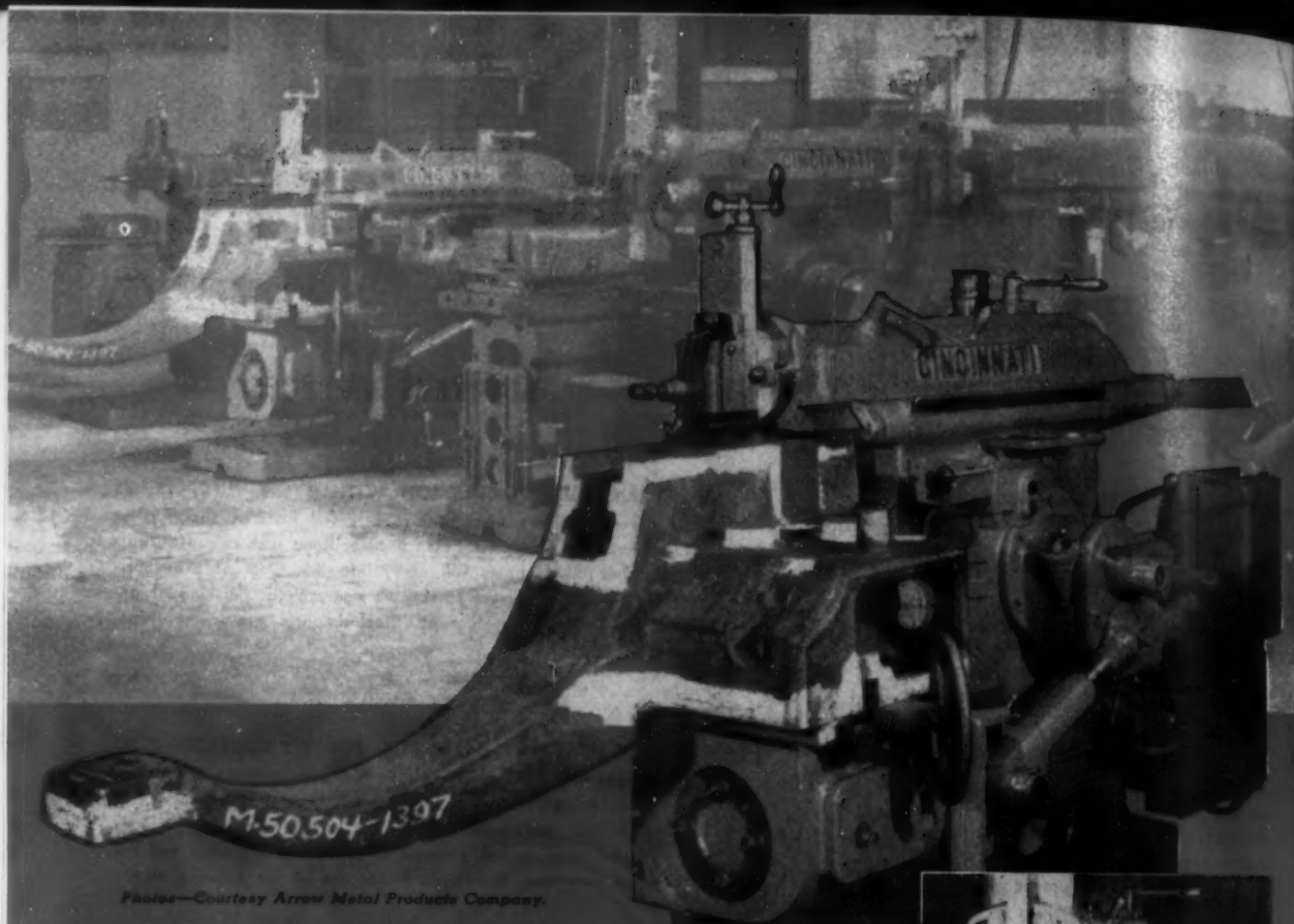
The outlook for steel consumers is definitely brighter this week. But steel producers have a new worry. They expect the market to shift from shortage to plenty on some products quite suddenly: They expect tough selling will be necessary for merchant and specialty items before the end of this year.

ALUMINUM SUPPLY CAN'T HIT 1952 TARGET—P. 202

DPA's Anderson tells aluminum producers that stockpiling is on the "must" list—but there won't be enough for that purpose next year. Industry has a few ideas of its own about stockpiling. July production up but output has been hit by series of setbacks. Alcoa's Wilson comments on Taiya project.

FTC EYES EXCLUSIVE SCRAP SALE CONTRACTS—P. 206

Now that the scrap supply has eased Washington anti-trust lawyers say exclusive scrap buying contracts are once again winning popularity. Federal Trade Commission is conducting a probe of this scrap buying method because of complaints received from some scrap men left in the cold.

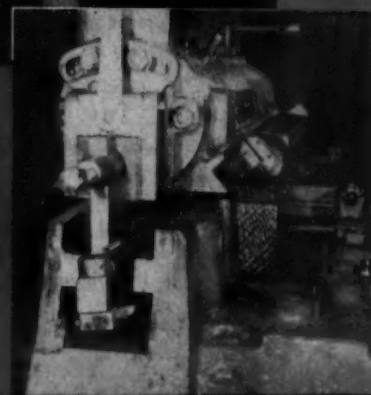


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September 11, 1952

Editorial

The Iron Age

FOUNDED 1833

The Older Worker

THERE is a serious manpower shortage in many areas of the nation. Firms which are decentralizing and those working on defense orders know this from first-hand experience.

Severe shortages prevail among engineers, tool and diemakers and skilled mechanics. This condition is not expected to change soon. The defense program has not as yet reached its peak.

The ability of the United States to defend itself, to maintain its way of life, depends on making the very best use of all our manpower. Proper use of that manpower in industry is the key to our whole future. It is almost criminal to waste skills that could be used to build up civilian production and military potential.

There is one profitable method of helping to lick the worker shortage, a method that is paying dividends. It is also a humane method. An increasing number of industrial firms are disregarding the 65-year old automatic retirement age.

Where an older employee with valuable experience is willing and physically able to continue to work he stays on after 65 years of age. The result—valuable production, easing of the manpower shortage and a longer lease on life for the worker.

On the older executive front, key men leaving full time employment are retained by many companies on a per diem basis. When intricate and knotty problems arise their advice is sought—and paid for. This helps industry and cushions drastic mental adjustments facing most retiring executives.

Productive labor pays its own way. Enforced retirement of able and willing workers is wasteful, both taxwise and humanewise. Recent studies show older workers to be steady, stable and capable of learning new methods.

The older worker should be judged on his value, experience and health—not on the mere fact that he is 60, 65, 70 or even 75. Any other path may be shortsighted.

Tom Campbell

Editor

There's more to the Sharon 430 Stainless Steel Story than you might think!

Sharon '430' is not a newcomer to the stainless family — quite the reverse. It is the granddaddy of successful stainless types. It antedates the chromium-nickel stainless steels by many years. is a thoroughly tested steel with volumes of successful applications.

Automobile manufacturers have long used this material for complicated beading and trim where both the fabrication and end use have put it to critical tests. Hospital equipment, appliances, utensils, jewelry, hardware have all been made from Sharon '430' successfully. Absorption towers, used in the manufacture of nitric acid, built of '430' more than a quarter century ago, are still in everyday service.

Sharon '430' Stainless is available today with few restrictions as to end use.

A new booklet with instructions on how to fabricate Sharon '430' stainless is available.

Get your copy by writing Department 4952, Sharon Steel Corporation, Sharon, Pa.

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Sharon 430 stainless steel

SHARONSTEEL

Dear Editor:

Letters from readers

More Sales Ahead

WE WOULD APPRECIATE IT IF YOU COULD PROVIDE US WITH 200 COPIES OF YOUR EDITORIAL "MORE SALES AHEAD" APPEARING IN THE AUG. 21 ISSUE. IF YOU CANNOT FURNISH MAY WE HAVE YOUR PERMISSION TO COPY THIS EDITORIAL FOR DISTRIBUTION TO OUR SALESMEN AND DISTRICT MANAGERS. THANKS.

K. P. RINDFLEISCH
Vice-President

U. S. Steel Supply Div.
Chicago

Diamonds

Sir:

We are interested in the separation of diamonds from sludge and dust from diamond finishing grinders.

The information on this subject seems to be quite limited and we are asking that you furnish us with any information you may have including the following: What is the specific gravity of diamonds and tungsten carbide?

E. G. CHAMBERS

Chambers Bros. & Co.
Pt. Wayne, Ind.

An article on the separation of diamonds from grinding dust appeared in The Iron Age, June 28, 1951, p. 76. The specific gravity of diamonds runs between 3.68 to 3.94 g per cc; and tungsten carbide runs between 11.00 to 15.25 g per cc.—Ed.

Tool Steel Directory

Sir:

We recently purchased a copy of your Directory of Tool Steels, and although it was very informative, it merely started our current investigation. We are writing at this time to advise you of certain major points discovered in our survey.

(1) No mention is made in your directory of the JIC (Joint Industry Committee) designation symbols which were put into use in 1950 or earlier. These are more of a definite specification than the ASM class numbers shown.

(2) Even the JIC numbers have now been made somewhat obsolete, as the successful interim use of them has formed a firm basis for the SAE type designations that are shown in the 1952 issue of the SAE Handbook.

(3) Your alphabetical index of trade names in the directory would be much more helpful if each listing were identified with the symbol of the class to which it conforms.

We trust the above information will help you in compiling your next revision to this directory.

B. KEMP

Goss Printing Press Co.
Chicago

Indeed it will. You'll see your suggestions in print in our Jan. 1, 1953 annual review issue.—Ed.

Statistics

Sir:

If possible we should like to obtain statistics on the quantity of quenching oils which are used in the heat treatment of metals.

Can you furnish us with such statistics or suggest a possible source for this information.

M. CARLSON
Librarian

Stinchley Research Laboratories, Inc.
Harvey, Ill.

We have not been able to find any information on the total use of quenching oils. However, we have learned that the closest approach to this is a survey now being compiled by the Dept. of Commerce. You should be able to get a copy of this report when available by contacting Mrs. Winona P. Stehman, Petroleum Div., Office of International Trade, Dept. of Commerce, Washington 25, D. C.—Ed.

Titanium Castings

Sir:

On the Newsfront page of your Aug. 21 issue there is an item concerning the production of titanium castings in sand molds, etc. Further, reference is made to valve bodies of titanium which are encouraging.

We are very much interested in any progress along these lines and would appreciate any further information that you can give us.

J. W. JUPPENLATZ
Chief Metallurgist

Lebanon Steel Foundry
Lebanon, Pa.

A special article on titanium will be published on Oct. 9 in which the latest casting development will appear.—Ed.

Use of CO₂

Sir:

Our engineers read with a great deal of interest your articles entitled "Carbon Dioxide Coolant Lowers Tool Grinding Costs" and "Central System Distributes CO₂ Coolant for Grinding" which appeared in your Aug. 14 issue.

We would appreciate receiving two reprints of these articles.

R. A. MCLENEGHAN
Advertising Manager

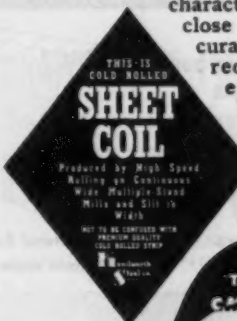
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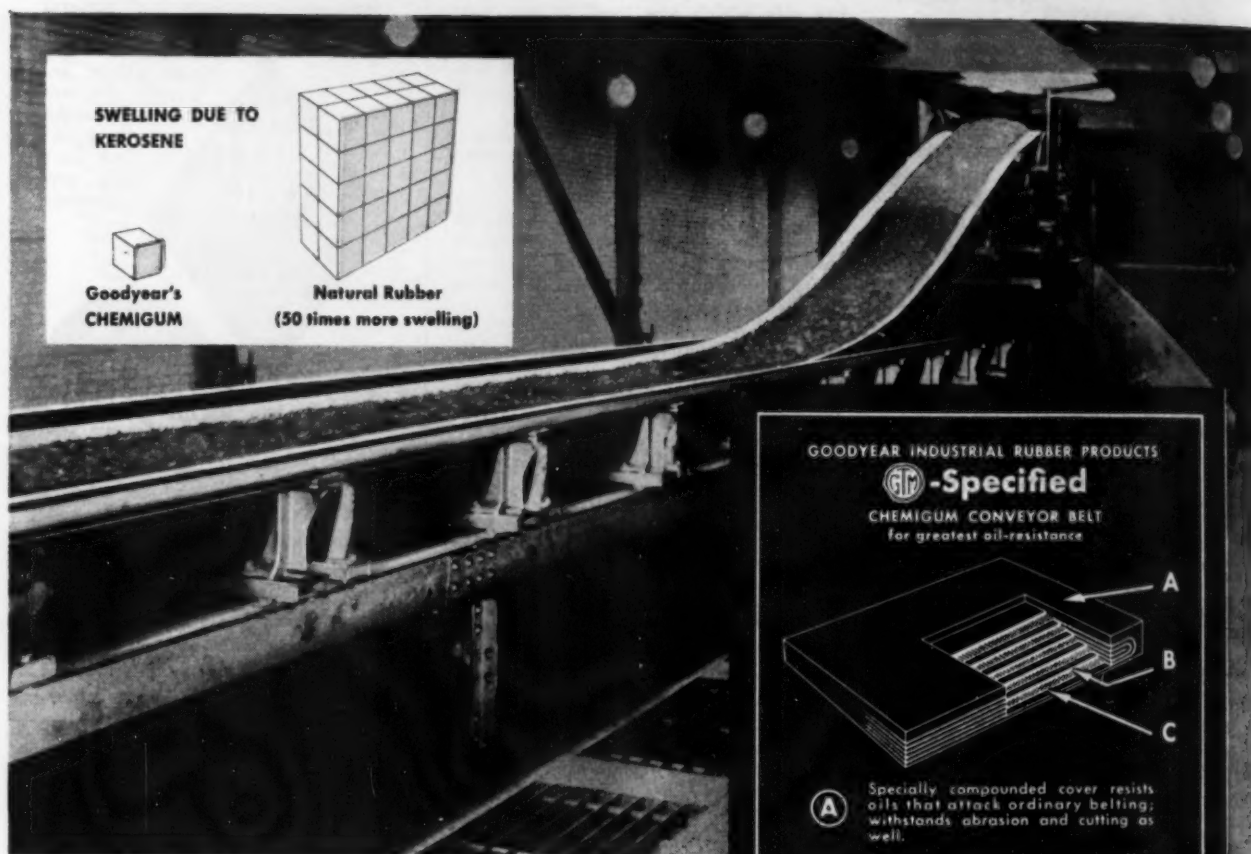
LONGEST-LASTING BELT

for handling Oil-Treated Fuel

HERE's graphic evidence of the oil-resistance built into the covers and carcass of CHEMIGUM conveyor belts—designed by the G.T.M.—Goodyear Technical Man—for use in service where severe oil and grease conditions cause premature failure of conventional belts.

Tests with kerosene show that Goodyear

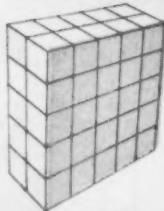
CHEMIGUM covers swell only 2% as much as high-grade conveyor covers made from natural rubber. (See Chart.) CHEMIGUM will also resist oil far better than many other oil-resisting synthetics used in belts. When destructive effects of such solvents are present, consult the G.T.M. for full details, or write Goodyear, Akron 16, Ohio.



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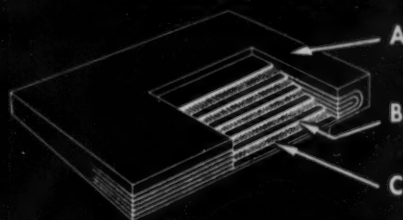
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- (B) Friction compounds between plies also resist oil and give belt long flex life.
- (C) Plies of duck reinforcement to fit individual job requirements.

GOODYEAR

THE GREATEST NAME IN RUBBER

Chemigum—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

Fatigue Cracks

by Charles T. Post

Shades of Basing Points

Last week a teletype clicked its clackety way into the news department with the most amazing piece of news. The Office of Price Stabilization, the thing read, has listed uniform ceiling prices by zones for sales to federal agencies, f.o.b. any destination within a specified zone.

Now we don't pretend to be an expert on the basing point system which was the accepted way of selling steel for many years until the Federal Trade Commission knocked it out a couple of years ago. But as we recall it, the basing point system meant selling f.o.b. a basing point city—which of course produced a uniform price from any mill selling in that area, regardless of where the steel was made.

It looks as though the OPS had better check with the FTC to see if they are not sanctioning a practice which the FTC charged was illegal. Of course, steel companies never thought it was illegal, morally wrong or anything else. Well, maybe it depends upon what side of the Potomac your steel is pickled on.

Versatile

Speaking of the teletype, your f.f.j. has always prided itself on the speed with which the latest industry news is relayed to the New York "city desk" via teletype. It has its other uses too, of course. One time the machine rang at 5:30 in the afternoon. Someone in Texas wanted some more information on a new development he had just read about in the Newsfront.

We were rather surprised the other day to receive an answer to a puzzler via the wires. L. C. Collingwood and R. L. Clavin, Welding Fittings Corp., were so anxious to give us their answer to the area problem that they just couldn't wait to get it on the wire. They even sent in a new puzzle for us to use. It will come along shortly.

Science is Wonderful

One of our spies has reported that Associate Editor W. B. Olson developed the ideal system for building a perfect lawn. The big obstacle to a beautiful lawn seems to be crab grass which survives the summer sun and hungry bugs and in no time at all takes over completely. Olson applied his

technical mind to the problem and soon came up with the solution. All you had to do, he reasoned, was to burn the crab grass seed in the fall so that it would not take root in the spring. So one fine day last fall Olson was seen, blow torch in hand, practicing the scorched earth policy.

Of course he would have to wait almost a year to observe the results of his labors but some interesting phenomena were readily apparent. The Pied Piper had nothing on him. Within a few minutes such a large crowd collected that he had to rope off the yard. The next day he realized he had discovered a substitute for the sun lamp. His legs were bright red—a "slight" radiation burn was all it was.

This year Olson waited eagerly for the crab grass to appear in his neighbors' lawns. Vacation time came so he had to give up his vigil for two weeks. On his return he saw spread before him the glorious fruits of his labor—the best crop of crab grass in the area.

He still claims that the seed blew into his yard from next door.

Puzzlers

It will cost the farmer in last week's puzzler \$186.60 to dig the trench. This low price is obtained by digging the trench straight down the left hand edge for 71.25 ft and then diagonally for 57.68 ft. If we could get the farm block to subscribe to your f.f.j. we might be able to reduce the national debt by the resultant savings in farm subsidies.

The circular area problem was much more confusing to us than it was to S. Rappaport, Ford Instrument Co.; A. Romeo, Denison Engineering Co.; W. F. McQuillin, Standard Buffalo Foundry Inc.; C. B. Smith, Portland Copper & Tank Wks.; H. W. Hardy, Jr., Buffalo Tank Corp.; J. R. O'Connor, Graver Tank Co.; R. W. Hautzenroeder, H. Ferguson Inc.; C. R. Simon, Michael Flynn Inc.; R. W. Huff, Canton, Ohio; C. E. Blass, Talon Inc.; G. Pascoe, Ford Motor Co.; F. P. Boulais, Campbell Soup Co.; J. Allentuck, Allied Chemical & Dye Corp.; A. L. MacDonald, The Holden Co. Ltd.; W. B. Hanson, International Harvester Co.; E. Dieckmann, Steel Founders' Society; H. L. Millar, Briles Mfg. Co.; W. C. Shortle, Scott & Williams Inc.; W. M. Ahern, International Harvester.

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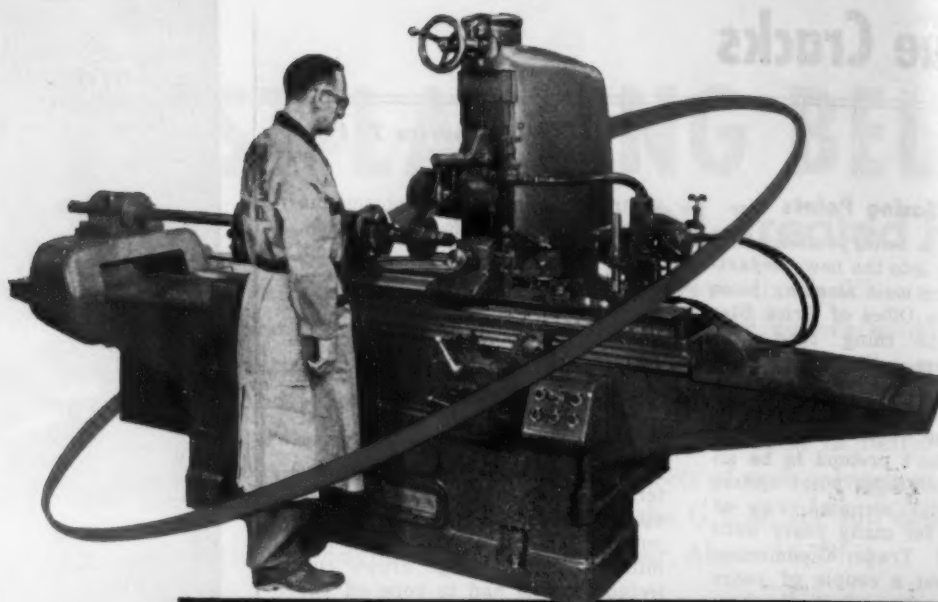
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Indexing mechanism
of the Helical Grinder



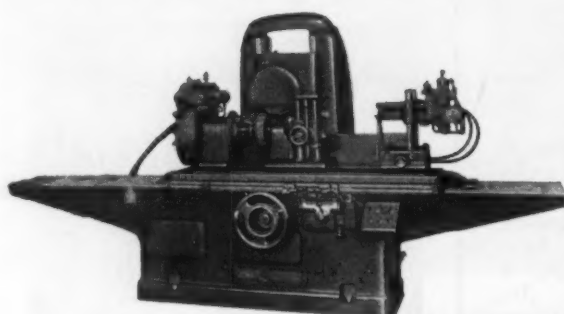
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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

THE IRON AGE Newsfront

► Stainless steel propellers have for 2 years been tested by the Navy on ice breakers, the roughest type of use. They have also been tried on landing craft sailing Arctic routes. Stainless steel has proved to have a longer life in these cases than the usual bronze propeller.

Now the Navy expects to test stainless steel propellers on destroyers on the assumption that greater strength of stainless will permit use of thinner blades. This is expected to reduce cavitation—the big bugaboo in propeller use especially in high speed ships. Stainless steel props for PT boats are also in the works.

► Tool steel salesmen anxious to cut down their manufacturing customers' costs are usually not able to get past the purchasing office. Purchasing men apparently have felt amount of money that could be saved was not enough to warrant passing the salesmen on to operating men.

But now more and more are getting through. In one case, a tool steel salesman saved \$50,000 a year for a moderate size plant by suggesting redesign and specification changes of dies, punches, etc.

► The number of military contractors who lost production because of the steel strike is much smaller than generally supposed. Implications of this are that today's 30 pct military grab of steel output will probably taper off well before the Nov. 30 target date.

► A new cartridge has been developed which safely permits addition of sodium, lithium, calcium, and other highly reactive agents to molten baths of metal. The cartridge is equipped with an injector mechanism triggered by a time-temperature fuze which releases the additive safely and efficiently. The additive agent is emitted in vaporous form as a jet.

► Methods of industry's recuperating after an atomic attack will be studied in San Francisco by Stanford University researchers under a federal grant. Study will focus on bomb damage appraisal, factory repair, vital stockpiling, line of rehabilitation authority, preserving records, alternate supply sources, emergency production, and labor relocation. Expected major bottleneck after bombing is blueprints. These usually gather dust after construction but may prove priceless for rebuilding after a bombing.

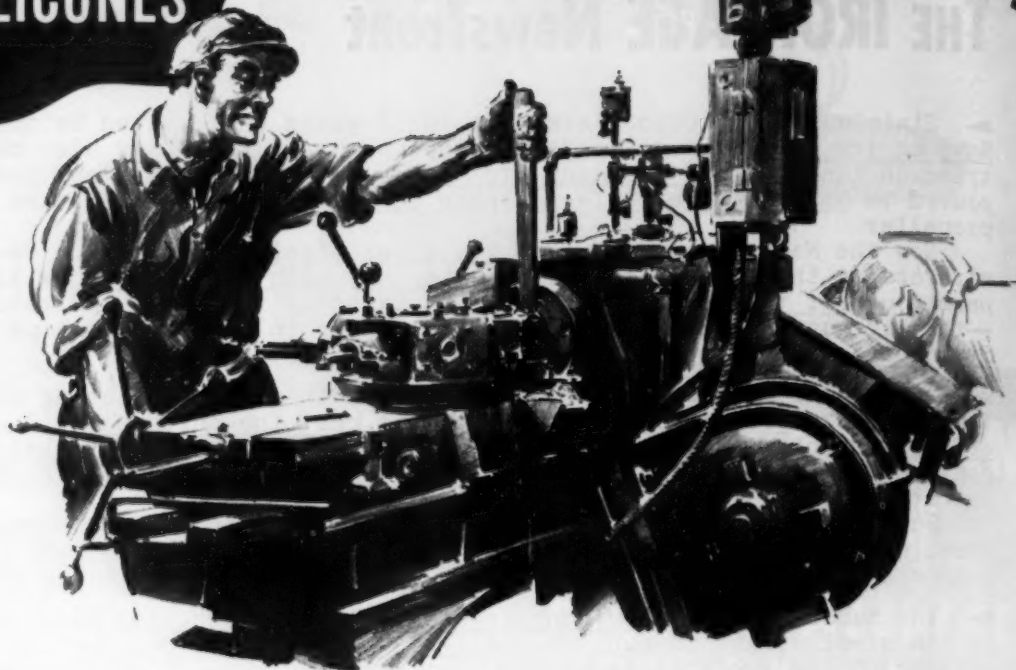
► A byproduct of the steel strike which caused worker layoffs may be labor shortages in specific areas—particularly where the work force is to some degree of a mobile nature. In Detroit, for example, a few auto plants are having trouble in getting men for extra shifts. Reason: Transient workers simply moved off to greener pastures when auto layoffs struck.

► Plastic dies may make their first substantial inroad into the auto industry soon. A major producer may be about ready to take them off the experimental list and use them in production. A major factor is the short time needed to produce plastic dies—about one-fifth the time needed to construct a steel die.

► Merchant products sales may be falling off well before the end of the year, including wire, fencing and small rods. Salesmen expect to be working for orders before the end of November. Conversion is beginning to show flagging signs at this early date. New orders are slow in coming. Farm equipment, automotive and construction industries are still interested, but may cut short large ton-nages in late November.

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Two years ago, 25 of these motors were rewound with Silicone (Class H) insulation by Canadian Westinghouse Company. Twenty of them have been in service ever since. The 5 replacement motors are still standing by, in spite of the fact that some of the more ambitious operators took the overload capacity of these Class H motors as a personal challenge.

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SHIPS: Western Yards Out of Doldrums?

Revival of coast shipbuilding industry hangs on fulfillment of Washington contract promises . . . Atomic carrier to be built on coast? . . . Why West's shipyards suffer — By T. M. Rohan.

Is West Coast shipbuilding reaching for a partial revival of its World War II glory when 292,000 workers launched \$8.7 billion in warbuilt ships?

This depends on how well Washington promises of hefty western shipbuilding contracts are kept. One stimulus to West Coast shipbuilding will be scrapping the government policy of diverting contracts to areas with general labor surpluses.

Shipbuilders here say Washington has belatedly discovered that a shortage of skilled help is possible within an area of labor surplus. New policy gives preference to areas with an abundance of skilled shipbuilding labor and to yards with the facilities to fulfill the contracts.

Some Changes Made—As recently as last February prospects for revived shipbuilding here were flimsy. At that time San Francisco yard representatives in Washington were told by the Navy that the San Francisco and nearby Mare Island Navy shipyards would concentrate only on repair and maintenance. But since then radical changes in this policy have been wrought.

The San Francisco Naval Shipyard has been promised a \$62 million conversion of the *Bon Homme Richard* from a 34,000-ton *Essex* class carrier into a 40,000-ton carrier. This took considerable agitation in Washington by a "watch-dog" committee.

The yard has also been promised it will build the third \$218 million *Forrestal* class supercarrier if it does a good job on the \$62 million conversion. The third carrier might well be the first atomic powered carrier in history.

Attack Submarine—The Puget Sound Naval Shipyard at Bremerton, Wash., which has 15,000 workers has been assigned five conversions with more scheduled.

The Mare Island yard has been awarded original design and construction of a new type attack submarine.

And in Maritime work, Bethlehem Pacific at San Francisco is working on five \$9.5 million *Mariner* freighters, the first major civilian West Coast ship construction in 4 years.

The plum of the lot is, of course, the third supercarrier which could be an atomic powered type. A nuclear reactor "suitable for propulsion of large naval vessels such as aircraft carriers" is being built by Westinghouse.

Won't Fit—The Navy has gone on record in favor of West Coast building of the third supercarrier. Among other things, this carrier would be too large to pass through Panama Canal locks. In an emergency it would have to sail around Cape Horn to reach the Pacific.

The Navy also favors encouragement of West Coast shipbuilding. But builders have watched the industry barely scratch along for

MAJOR WEST COAST SHIPBUILDING YARDS

Location	Ways & Docks	Length
Mare Island Navy Yard Vallejo, Calif.	2 graving docks	683 and 418 ft.
Moore Drydock Co. Oakland, Calif.	2 floating drydocks 8 shipbuilding ways	516 and 423 ft.
Bethlehem Pacific San Francisco	5 drydocks 11 shipbuilding ways	270 to 654 ft.
Bethlehem Pacific Los Angeles	1 floating drydock 4 building ways	514 ft.
Todd Shipyards Corp. Alameda, Calif.	2 floating drydocks 4 shipbuilding ways	Largest 472 ft.
Todd Shipyards Corp. Los Angeles	3 shipbuilding ways 1 floating drydock	492 ft.
Todd Shipyards Corp. Seattle	10 shipbuilding ways 4 floating drydocks	412 to 822 ft.
U. S. Maritime Yard Alameda, Calif. (on standby)	4 shipbuilding ways	
U. S. Maritime Yard Richmond Yard No. 3 Richmond, Calif. (on standby)	2 graving docks 5 shipbuilding ways	580 ft. each
U. S. Maritime Yard Vancouver, Wash.	12 shipbuilding ways	
Puget Sound Naval Shipyard Bremerton, Wash.	3 graving docks	620 to 927 ft.
Long Beach Naval Shipyard Long Beach, Calif.	3 graving docks (inactive—soft ground) 1 floating drydock	One 1105 ft. Two 609 ft.

Special Report

Continued

years, except under the pressure of war necessity. They are extremely skeptical.

All the contracts now being promised would not commence until well after the November elections. No preminiary work has been done. And the Newport News yard will complete the *Forrestal's* hull-work in 1954 when work would begin on the third supercarrier.

Most of the promising is being done by politicians who may not be around after January when the time comes to make them good—notably California's Rep. Frank Havenner of the 4th district, a veteran Democrat and friend of the Navy who is up for reelection.

Moreover Secretary Kimball is retiring at the end of the year.

Violent Strikes—On the debit side San Francisco is notorious for its violent shipping and shipyard strikes one of which was only recently settled. A month ago Secretary Kimball on an inspection visit to San Francisco was abused at a meeting by a local labor leader for doubting that San Francisco Naval shipyard workers could handle a specific job.

Many shippers pay higher rail freight costs to the West rather than risk having shipments tied up at the docks by a strike.

West Coast yards are saddled with somewhat higher costs of about 10 pct due to shipment of many parts, and because they are at the end of the supply line for large eastern steel. In common with all other U. S. yards they also face "economy" tactics of the Navy. These involve taking the lowest sections of each shipyard's bid on smaller craft, especially

minesweepers, and attempting to negotiate a single figure by combining the lowest parts of all bids.

Hobbled by Costs—

While war-built dry-docks rot in the sun, western oil and steamship firms have tankers made in Eastern yards and Japan because they get them cheaper.

And Western yards often lose in competitive bidding because of higher costs of hauling main propulsion machinery and hull plates from the East. This cost disadvantage may be dulled by local mills increasing maximum rolling capacities and by the work of firms such as Westinghouse at Sunnyvale, Calif., which has built propulsion turbines up to 8500 hp.

Also, there is competition between private and Navy yards. Unions favor private yards because most workers in Navy yards are civil service employees and union membership is not obligatory. But unions are strenuously supporting the supercarrier campaign in the interest of shipbuilding employment and its projection into other industries.

The steel strike set Bethlehem Pacific at San Francisco, largest western civilian yard, back at least 3 or 4 months on a \$47.5 million contract for five 12,900 deadweight ton high speed Mariner type freighters. This contract awarded last year was the West's first major non-military shipbuilding award in 4 years.



REPAIRS: U.S.S. *Princeton*, an Essex class carrier, in the No. 3 graving dock at San Francisco Naval Shipyard.

Progressive Lags—The entire Bethlehem program is 15 months behind other yards because of steel allotments. Bethlehem's San Pedro yard on Terminal Island in Los Angeles harbor which built 26 World War II destroyers and converted cargo ships to troop ships has struggled back to its prewar employment of 700, doing mostly service and repair. It can handle ships up to 15,000 gross tons.

The seven Maritime Commission yards operated by Kaiser during World War II employed over 200,000 and made 1490 ships. Today only one yard at Richmond, Calif. is now on standby. Three other yards at Richmond, two at Portland, Ore., and one at Vancouver, Wash., with a total of 58 shipways, have turned to other tasks.

Rehabilitation would have to start practically from scratch. Coast shipbuilding facilities are still large enough for the biggest ships.

The San Francisco navy yard would need only relatively minor additional physical equipment to take on the third carrier. But its present repair work would suffer enormously or move elsewhere.

READY FOR ACTION: A destroyer steams under the San Francisco-Oakland Bay Bridge after maintenance work at the San Francisco yard.



ALUMINUM: Third Round Coming Up?

May announce new goals this week . . . Expected to be about 250,000 to 300,000 tons . . . Still seek new producers . . . New power shortage hits output in Northwest—By R. L. Hatschek.

Domestic aluminum capacity has risen fast enough to eliminate the metal from Washington's tight supply category and at least one new producer is getting in the field. But increased stockpile aims and a second low-water year in the Northwest are preventing a rapid loosening of the market for aluminum.

Much-talked-about third round aluminum expansion goals may be announced this week. The probable target will be about 250,000 to 300,000 tons of domestic capacity. Aluminum Co. of America has indicated it would give consideration to this third round and is expected to do so despite frowns from Washington's trust busters and possible Justice Dept. action.

Possibilities—The government will still consider Aluminum Co. of Canada as a possible supplier but the preference will be given to new domestic producers. Many firms have shown interest, only to drop out of the picture eventually. Current possibilities are Olin Industries, Kennecott Copper Corp. and Spartan Aircraft Co., with particular emphasis on the first two.

Trouble is—and this has been pointed out many times—that aluminum production does not lend itself to small business. It is a big and costly proposition and it will take big companies with solid finances to take the risks necessary. This is the reason so many have changed their minds.

New capacity goals are based on military and stockpile needs as outlined by the government, not on any obvious demand from civilian sources. That's why many of the possible new producers want government subsidies or at least assurance of a firm market for a good while to come. Washington has been asking for a private risk based on military possibilities.

What Basis?—And some people are asking whether the tonnages named are based on actual bills of materials for planes the Air Force really wants or on a vague percentage of the Air Force budget.

The fourth U. S. aluminum producer is now set to go ahead with construction of a reduction plant. The joint Anaconda Copper Mining Co.-Harvey Machine Co. venture, to be known as Anaconda Aluminum Co., will be supplied alumina from Reynolds Metals Co.'s refinery now under construction adjacent to its San Patricio plant (See THE IRON AGE, May 22, 1952, p. 79).

Latest plans call for a shift from the previously picked site near Kalispell, Mont., to another near Columbia Falls. Reason for the shift was given as the fears of the agricultural population of the area about possible damage to crops and livestock. Anaconda labeled these fears "unfounded" but decided to move anyway.

Drought—This year has been another dry one in the Pacific Northwest. Early thaws and too quick a spring run-off combined with below-average rainfall through the summer have created a new power shortage in this important

aluminum-producing area. Interruptible power was cut last week and may be completely shut off soon. November will be critical.

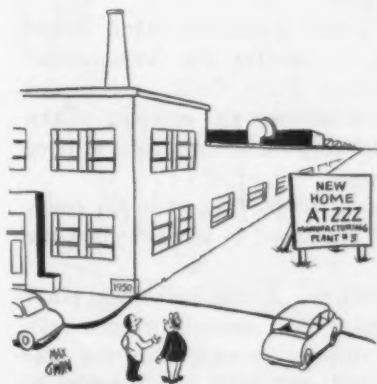
Early fall rains could be a help but about 5000 tons of aluminum production has already been lost and the industry is faced with a total loss of about 59,500 tons if the dry spell continues through the rest of the year. Alcoa puts its maximum possible loss at 17,500 tons. Reynolds estimates 8500 tons may be lost and Kaiser Aluminum & Chemical places its possible lost production at 33,500 tons.

The aluminum industry has asked Washington that it be given priority on available power in the Northwest because of the pressing need to maintain high production. It will be remembered that "brown-outs" were enforced during the last war to give power to aluminum.

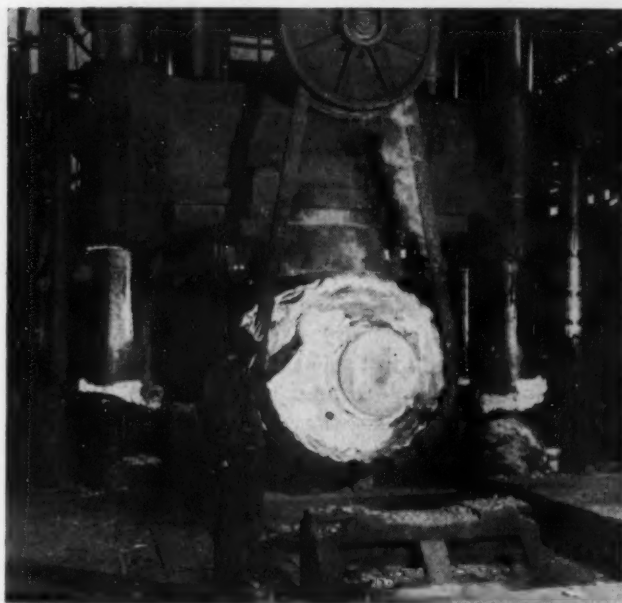
Hold Stockpiling—With aluminum just off National Production Authority's critical supply list, government stockpiling of the metal was due to be resumed in the fourth quarter. But, in view of the power situation, producers have requested this be delayed so as not to disrupt current improving market conditions. It now appears that the government will postpone the stockpiling (See p. 109). After all, an on-again, off-again supply does neither the consumer nor the producer any good.

Productive capacity is still on the upswing with Reynolds being the latest to announce new facilities coming into operation. The company's smelter at Longview, Wash., was just boosted to the 50,000-ton mark by the completion of an additional 20,000 tons of reduction capacity. A \$1 million cryolite recovery plant is being constructed adjacent to the smelter.

Floor area of the reduction plant was not increased despite the capacity boost. The pots were "stretched" 65 pct without any increase in number. No production has been lost here because of the drought since the switches on interruptible power were not to be thrown until next month.



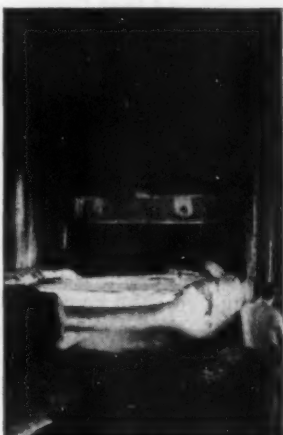
"Our largest plant would have been finished by now but it took time to get building permits from the different states."



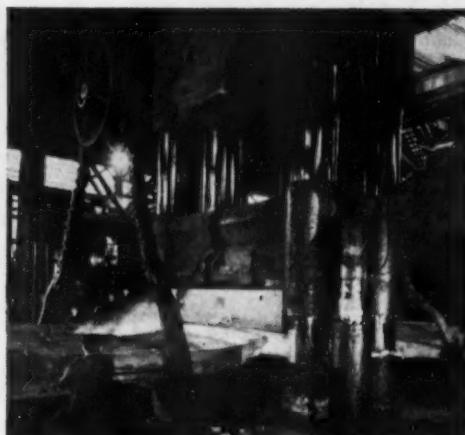
FIRST STEP: A 92-in. ingot is maneuvered into the 7500-ton forging press as the first step in producing the giant rotor discs.



GRAIN: After cropping and upsetting, diameter is increased. Kneading action of press refines the grain during forging cycle.



WIDTH: Ingot is reduced to desired thickness by the press.



TOGETHER: Lips on two forgings are reduced simultaneously to avoid unequal press loading.



MACHINING: Rough work is done at Bethlehem, and finished to specifications at customer's mill.

Giant Rotor Forgings Hard to Handle

Eleven giant rotor discs—18 ft in diam, 9 in. thick, and nearly 50 tons apiece—brought headaches all along the line to Bethlehem Steel Co., Bethlehem.

Parts, to be used in motors to power supersonic wind tunnel compressors at National Advisory Committee for Aeronautics' Ames Aeronautical Laboratory, Moffett Field, Calif., are forged from 92-in. ingots. Limited distance between the columns of the 7500-ton forging press meant partial forging of two discs at once to avoid unequal loading of the press.

Furnace used for heat treating is one of the largest in the country. But it still had to be extended by a hood to accommodate the forgings.

Moving the discs was a special problem. At the Bethlehem plant they were sent from station to station on a specially rigged railway flat car. Too unwieldy to be shipped by rail, each disc was loaded on a low-bed trailer truck and sent with police escort to Philadelphia. There they were sent by water to Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for finishing.



MOVING: Disc is moved about plant on a specially equipped railroad well car.

CONVERSION: Fall Frost Will Nip It

Slipoff seen striking after November . . . Some popular items will carry into '53 on subdued scale . . . Costs run too high . . . What products give conversion steam—By K. M. Bennett.

Conversion still blooms, but there are hints of an early fall frost. Steelmakers in the Midwest predict a post-November dropoff in conversion steel purchases. (Conversion is buying semi-finished steel from one mill and having it rolled to desired finished shapes at another.)

Currently, automotive and farm appliance purchasers are interested in conversion steel, and appliance and construction equipment makers are following up. Oil producers, as in the past, are a good and continuing outlet for conversion items.

Which means that conversion will not die root and branch after November. Bars, plates, and hot-rolled sheets will carry into 1953. But it will be Indian summer for conversion.

Imports vs. Conversion—The answer lies, in the main, in consumers' pocketbooks. Conversion costs, often double and treble normal steel prices, are nagging worries. A plate buyer commented that he's been able to buy Japanese, Belgian, German, and French plates at prices below conversion costs.

Unless foreign steel prices climb sharply, the high cost of conversion will give foreign steel purchases a firm boost. At any rate, the possibilities of foreign steel will whittle down domestic demand for conversion ingots and rolling space. (See p. 92.)

Longest life-span in conversion may well be for:

Plates: over 72 in. in width and over $\frac{3}{8}$ in. in thickness will be in a strong demand as late as first quarter '53. Particularly difficult will be hot top quality material, of the type used in high pressure tanks. Any plates of over strip mill width will offer difficulty well into 1953.

Deep in Conversion—Bars: are high on the conversion list. Auto parts, automotive, machinery and farm implement manufacturers have been active in securing hot-rolled and cold-finished bars through conversion channels. Strike-stimulated military set-asides now take 27 pct of mills' output and 40 pct at the cold finishers' level.

Since cold finishers argue they cannot get guaranteed mill delivery dates, and since they have backlogs of as much as 3 months, hot and cold bar users will have to depend on conversion for a time.

Yet there is some room for a chill optimism. Steel producers say military set-asides are too high, and that rated producers will not purchase all the bars held

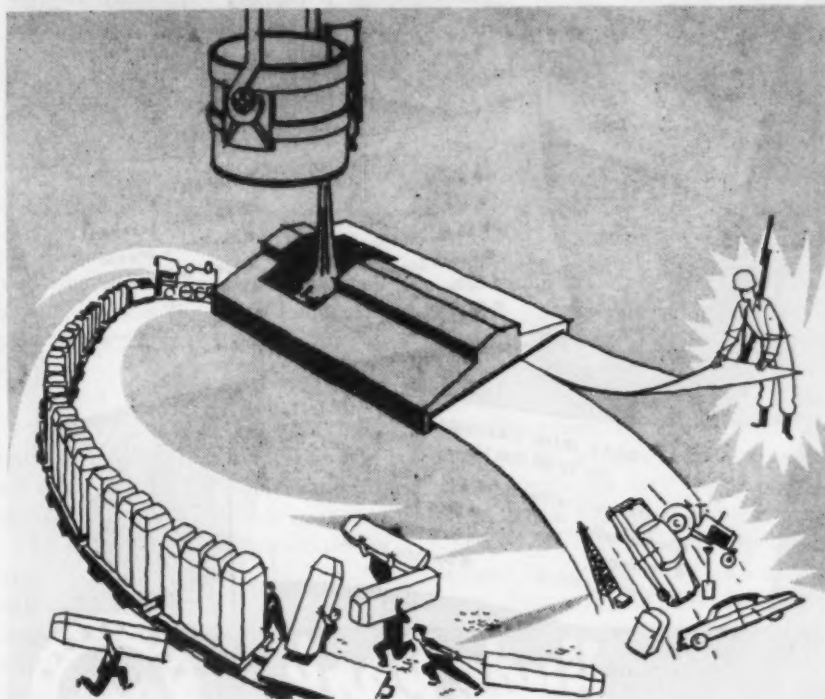
for their use. And cold finishers say that while shortages will continue in items like resulfurized, killed steels (with the military taking all of this it can get) other bar tonnages that have been set aside may be in excess of real military need.

Close to the Vest—Even bar converters are playing a close and wary game, buying generally on short term arrangements. The cold finishers seem glad to get conversion work because their own deliveries of hot-rolled bars are either down in volume or they are receiving a fair volume of bars on pre-strike orders that aren't desirable at present.

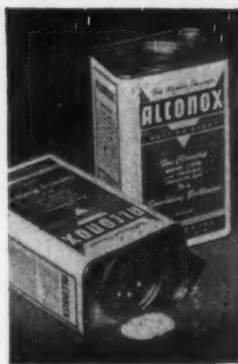
One offers 2-week delivery on conversion orders for 1.5 in. to 4 in. cold-finished rounds. Their order books indicate a sharp dropoff in conversion in the last months of '52.

Hot-rolled sheet: is in strong demand and will carry as a conversion steel into early 1953. Automotive and appliance people have

The Conversion Story



HOW IT WORKS: Conversion of steel is the result of shortage. For instance, if a Detroit automaker needs steel sheets and regular mill sources are closed to him, he sometimes may find a steel mill with an excess of semi-finished steel. He buys this steel from the mill and then locates a steel mill with surplus rolling capacity to roll the semi-finished steel to the finished shapes he must have.



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—Production—

been ordering actively. Extra wide sheet seems to be very popular with buyers. They'll accept it at conversion prices as late as first quarter '53, it is reported.

In the Mill—What, then, is the picture in a mill doing conversion work? In one integrated mill, direct military work takes up about 20 pct of the output. Military hold-overs dating back to the strike will be cleaned up by Nov. 30. Of their current output, military set-asides call for over 20 pct of plate production, 27 pct of bar production, 13 pct of cold-rolled sheets, and 22 pct of hot-rolled sheets.

The mill hopes to clean up civilian back orders by the end of the year. A cut in military needs, occasioned by overly generous military set-asides, would accelerate this filling of old civilian orders at that time.

With warehouses collecting 120 pct of their old allotments, they too may be building up inventories. All of which does not mean that steel purchasers will be wallowing in inventories of steel in the first quarter of '53. But it does presage a speedier end for conversion than was anticipated in mid-July.

Nickel Electroplating Use Eased

Electroplaters are now permitted to use nickel in a strike of up to an average thickness of 0.00005 in. for protective coatings under electro-deposited chromium on articles which were previously prohibited.

National Production Authority will not make any additional allocation of nickel anodes or chemicals to the electroplating industry, however.

Purpose of the action is to allow electroplaters to extend business into non-defense areas where this work furnishes the bulk of occupation in small shops.

By this amendment of M-80, NPA recognizes functional necessity for a very thin nickel coating as a base for chromium plating. It likewise places the electroplating industry on the same footing for nickel usage as the vitreous enamel and silverplating groups.

ORDERS: How Valid Is August Upturn?

Purchasing agents hope rash of buying during August is not flash in the pan . . . Signs point to more business, higher costs, squeeze on profits . . . Some orders delayed by strike.

Business is getting better, but more inflation is on the way. There are fresh signs of greater activity, higher costs, and a general squeeze on profits.

A rash of buying during August closed the gap between new orders and outgoing production for the first time since March of last year, the National Assn. of Purchasing Agents reports.

This is good news. But the picture may not be as bright as it looks at first glance. The PA's say the upturn of orders resulted partly from (1) settlement of the steel strike, (2) resumption of some operations after vacations and shut-downs, and (3) the usual seasonal pickup.

Delayed by Strike—There is no doubt a lot of these orders which normally would have been placed sooner were held up by the steel strike. Some orders couldn't be placed then. Others were deferred because there was no sense ordering some needed items far in advance when others (such as steel) couldn't be obtained.

Settlement of the strike broke the order dam, turning loose a wave of business. Anxiety focuses on whether it will be a flash flood, or hold at the higher level. Chances are the buying tide will recede somewhat, but stay higher than in recent months.

Prices are on the rise again. A greater number of buyers reported they had to pay higher prices than at any time in the past 18 months. Basic metals, steel, copper and aluminum set the pace. Increases were also noted on ferro manganese, silver, cotton yarns, acetate rayon, linseed oils and edible oils.

Some Prices Slip—But price increases were not general. The following commodities declined: Zinc, tin, cadmium, tung oil, soft

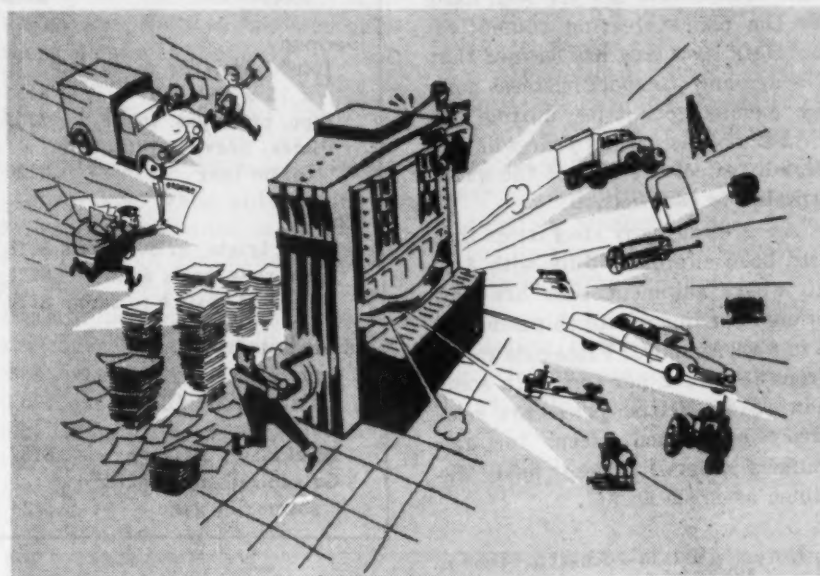
coal, rubber and paper goods, jute and burlap.

Raw material inventories are down to a new low for the year. They are also badly unbalanced. The steel strike is a big factor in this too. In the months immediately ahead it seems likely that the buying of many other com-

have reached a low point and have huge gaps that must be filled to assure even production. High price levels are expected to add a practical brake on inventory accumulation. For some firms the financial strain of high-priced inventory is becoming an ever increasing problem. With rising costs of inventory already draining capital, new expansion is made more difficult.

Some sources believe pressure for quick delivery and cooling interest beyond 90 days or so (especially if quotations are high) reflect distrust of the market.

New Orders Match Output



modities will be greatly influenced by the success (or lack of success) purchasing agents have in getting steel.

Present 30-day limit on steel inventory is expected to hold back buying of other materials, as well as steel. This is because buying policy tends to be geared to inventories of hard-to-get material. Industry generally regards the 30-day limit as impractical. It is doubtful if it will be observed any more closely than was the 45-day limit before the steel strike.

Quick Delivery—Present buying policy is geared to quick delivery. This is because inventories

To some extent this is borne out by the purchasing agents' report. More than half (58 pct) of them believe industries dependent on steel will be able to iron out schedule difficulties by the end of the year. The balance (42 pct) estimate shortages will still plague them in the first part of next year.

List of hard-to-get items is topped by steel, copper and aluminum. Others are nickel, tungster carbide, industrial diamonds, phenols, and nickel, copper and brass scrap.

Employment is on the increase and is expected to continue expanding as military spending continues its upward march.

STEEL: Europe Cuts Export Prices

Decline comes suddenly in spite of rise in home market . . . Schuman Plan members fight for export quotas . . . Size to be largely determined by '52 business . . . British prices firm.

Export prices on European steel, more or less stable through August, have taken a sudden dip. But domestic prices are rising. In Germany they rose DM 50-70 per ton after ceilings were lifted.

Drop is tipoff to fierce fight for export business by Schuman Plan members. Sudden boost in interest stems from jockeying for place when export quotas are handed out. These have not yet been fixed by the plan's steering committee, but THE IRON AGE has learned that the amount of export business done by member countries during the first 9 months of this year will materially affect the size of the quota granted to each nation.

As a result many steel items that had been offered in July with 8 to 10 weeks shipment time are now offered for immediate shipment for 2 to 3 weeks only. Price cuts range from \$5 to \$12 per ton, with some down \$15. British prices are relatively unchanged except for galvanized items. These have declined as much as \$11.

Enter Austria—Austria too is entering the export market. Its steel production may soon reach 900,000 tons annually, but the country can't absorb more than 500,000 tons. So the remaining 400,000 tons, much of it high-quality steel, is being offered for export.

Steirische Gussathlwerke, Judenburg, Styria, has opened offices in Germany, Holland and Great Britain. The firm is booking orders for tool steel, alloy steels, stainless, etc. Alpine Montangesellschaft is competing with Japan for ship plate business, has sold 12,000 tons to Austria, 17,000 tons to Denmark, 9000 tons to Portugal, and a total of 18,000 to South Africa, Pakistan and Ceylon.

The Austrian works are mainly

competing against the Schuman Plan countries, which so far have not dissolved their own export organizations.

Europe's Prices Today

per ton, f.o.b. ports

Belgium-Luxemburg	
Reinforcing bars	\$105
Wire, galvanized, basis	\$135
Plates, ½ in., black, mild steel	\$142
Germany	
Joists, basis ¼ to ¾ in. x 75 x 100 mm	\$155
Pipe, black gas, water	\$207
Plates, heavy, ½ in., up to 3m long	\$120
France	
Wire, bright, in 50m coils	\$118
Wire rods, basis 6mm	\$121
Flat steel basis 6 to 50mm	\$119
Great Britain	
Square steel, ½ in. basis	\$46
Universal steel	\$133
Boiler plates	\$48
Blackplate, 20 gage	\$182
Galvanized corrugated sheets, 24 gage	\$224

British Automobile Output Down

British passenger car production in the first 6 months of this year was 228,052, 16,500 less than in the first half of 1951. The annual rate of production for the first 6 months is 456,104, which compares with an actual output for the whole of 1951 of 475,919.

Germans Shy At Arms Making

Arms production in West Germany is the big item of conversation on the Continent today. The United States picked the I. G. Farben building in Frankfurt to house the central buying agency for all European arms.

An IRON AGE correspondent just returned from a tour of Bonn,

Essen and Frankfurt plants learned that the U. S. has asked some 30 former arms makers to submit bids on all types of munitions. Dollar advances have been promised to help plant financing. Officially Germany is not yet allowed to make even hunting rifles.

A meeting of German producers asked Krupp Works president Dr. Hardach to declare officially that they would go on making milk cans rather than guns. They won't even make weapons for German troops in the ECD. Their big interest is in export items.

IRON:

Swedish ore, pig output at high levels . . . Exports, prices rise.

Sweden's iron ore production amounted to 15.39 million tons last year compared with 13.61 million tons in the previous year. About 10.1 million tons of the whole production came from the State mines of Luossavaara-Kiirunavaara and Gällivare.

Production of pig iron amounted to 851,300 tons, compared with the peak amount of 854,000 tons in 1944. Production of ingot steel increased from 1,436,830 tons in 1950 to 1,503,991 tons—a new high.

Going Up—So far Swedish iron ore has not been affected to any extent by the severe depression which has hit a number of raw materials such as forest products. Both the exported quantity and the price per ton are rising. Exports last year were about 15 million tons and it is expected that exports this year will be even larger. In the first 4 months of the year 4.1 million tons were shipped as against 3.4 million tons in the corresponding period last year.

Average price during the first few months last year was slightly over 33 krona a ton and for the whole year about 1 krona higher. But this year there has been quite a substantial rise. In the first 4 months the average price was nearly 49 krona a ton and if April is taken alone the price then was 56 krona, over 60 pct more.

WANTED: 19,000 Skilled Workers

Government employment offices show about 49,000 job openings . . . Demand for skilled workers tops . . . Future manpower needs indicate long-term problem—By R. M. Stroupe.

In California, the word is out to hire more machinists. Around Wichita, Kan., experienced aircraft construction workers are not plentiful enough to fill vacancies. Aiken, S. C., reports greater numbers of openings for plumbers, gas fitters, and steam fitters.

Lack of trained personnel available in local labor markets is forcing industry to look far and hard for workers. Latest government study of this problem showed nearly 49,000 jobs of all types awaiting applicants through 1800 state employment offices. High up on the scarce list are engineers, draftsmen, tool makers, die-sinkers and setters, nurses, typists, and stenographers.

Skilled workers are being sought to fill more than 19,000 job openings. Nearly every state has reported requirements for machinists, 3300 of them, with California, Pennsylvania, Ohio, Illinois, and District of Columbia showing the greatest need.

Thirty states have a demand for 2200 toolmakers, die-sinkers and setters.

Area Needs — In Connecticut, Ohio, New Jersey, and New York there are 1400 vacancies in machine shops and related lines.

A total of more than 12,000 jobs can be obtained by semi-skilled workers applying through public placement offices. In aircraft-building occupations the need continues to mount.

Requirements for professional and managerial personnel are concentrated in engineer and draftsman groups. Business has given notice that it can employ 4200 mechanical, electrical, civil, industrial, and chemical engineers and 2800 draftsmen without delay.

All the foregoing are immediate needs as reported through state

placement channels. Short as the labor supply now is in various categories, it's going to get scantier in the months ahead if current defense production schedules are maintained.

Industry Needs—An example of this growing demand is furnished by the aircraft industry. About 640,000 persons are working on airframes, engines, and components. This number includes only those in plants that turn at least half their production over to plane construction. In the next 17 months, the industry expects to need at least 200,000 more workers.

Shipyards, while anticipating a slower growth, want to have several thousand additional workers on their payrolls by December. Despite use of hiring standards the government finds "reasonable," 2 out of 3 yards have reported employment difficulties. Categories hardest to fill are not those peculiar to this industry and include machinists, patternmakers, car-

penters, boilermakers, welders, riveters, pipefitters, and crane operators.

Almost half of shipbuilding employment is handled by Navy yards. If both private firms and the Navy hire all workers needed by December, the total will approximate 300,000.

Hirings in ordnance and military electronics fields are expected to climb markedly before the end of the year. Together, these industries employ about 500,000.

Among steel foundries, only about 4 out of 5 have indicated they have openings that are difficult to fill. Principal shortages are among welders, molders, and machinists. To a lesser extent, crane operators and clerical workers are needed. Steel castings plants set a goal of 4000 additional employees from May to November.

At least 25 machine tool plants have had a continuing shortage of production workers. Their hiring schedule through the end of this month is on the way up.

Lasting Problem — Government agencies, aware of the drain a larger military draft can make on manpower, are studying methods for getting better utilization of workers.



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Construction

Steel Inquiries and Awards

July bookings of fabricated structural steel, as compiled from reports received by the American Institute of Steel Construction, amounted to 221,389 tons, an increase of 32% over the previous month. Total bookings for the first seven months of 1952 were 1,478,211 tons or at a rate of 211,173 per month.

Shipments during July were 125,860 tons, below the monthly average, but 8% greater than the previous month. Shipments for the first seven months of 1952 totaled 1,496,423 tons.

The backlog of work ahead as of July 31 stands at 2,361,027 tons.

Estimated Total Tonnage for the entire industry

CONTRACTS CLOSED	1952	1951	Avg. 1947-1950
Total Tonnage			
January	218,110	361,273	141,976
February	230,832	256,746	152,194
March	226,394	297,517	221,357
April	209,106	337,026	177,325
May	209,888	268,166	176,244
June	167,492	207,966	194,725
July	221,389	222,546	229,334
Totals	1,478,211	1,951,334	1,315,699

SHIPMENTS	1952	1951	Avg. 1947-1950
January	244,947	214,000	166,910
February	246,398	193,633	161,176
March	268,540	237,037	191,297
April	230,670	234,095	192,961
May	244,222	234,436	196,436
June	125,486	257,066	192,351
July	135,860	204,390	183,329
Totals	1,496,423	1,574,752	1,336,844

TONNAGE OF BACKLOG 2,361,027 2,687,974 1,251,315

Percentage scheduled for production within the next four months

(To Nov. 30) 44% 42% 56%

Percentage scheduled for production after the next four months

(From Dec. 1) 56% 58% 44%

Reinforcing bar awards this week:

133 Tons, Boston and Chelsea, Mass., superstructure of Andrew P. McArdle Bridge over Chelsea River connecting Meridian St. in East Boston and Pearl St. in Chelsea. Completion date June 30, 1954.

181 Tons, Northampton County, Pa., divided highway, service roads and ramps, two concrete bridges, one I-beam bridge. Pennsylvania Dept. of Highways, Harrisburg, Pa. Bids to Aug. 29, 1952.

206 Tons, Tolland and Willington, Conn., construction of three bridges, and grading and drainage. E. B. Burdick, Hartford, Conn., district engineer.

Reinforcing bar inquiries this week:

773 Tons, West Springfield, Mass., bituminous concrete and cement concrete, underpass structure, reconstruction of dike and alteration of bridge, Connecticut River. Berke Moore Inc., Boston, Mass.

Fabricated steel awards this week:

3100 Tons, Lockheed Aircraft Corp., Marietta, Ga., jet flightline service hangar and functional test building, to American Bridge Div. of U. S. Steel, Birmingham, Ala.

1235 Tons, West Springfield, Mass., bituminous concrete and cement concrete, underpass structure, reconstruction of dike and alteration of bridge, Connecticut River. Cyril B. Raymond, Greenfield, Mass., district engineer. Completion date June 28, 1954. Berke Moore Co., Inc., Boston, Mass., low bidder.

420 Tons, Tolland and Willington, Conn., construction of three bridges, and grading drainage. E. B. Burdick, Hartford, Conn., district engineer.

128 Tons, Fall River, Mass., two span steel stringer bridge and bituminous concrete pavement. Bridge is over Eagle St. Frank A. Chase, Taunton, district engineer. Completion date June 30, 1953. Campanella and Cardil Construction Co., Hollisgrove, R. I.

Expansion

J&L GROWTH:

Firm plans purchase of 34 acres . . .
Could be site for extrusion mill.

Jones & Laughlin Steel Corp. plans further expansion of its Pittsburgh Works. It is acquiring 34 acres of land for this purpose through the Pittsburgh Urban Redevelopment Authority.

The company previously had acquired 20 acres in a blighted area adjacent to the Pittsburgh Works and erected a \$70 million plant including a new openhearth shop with an annual capacity of 2 million tons.

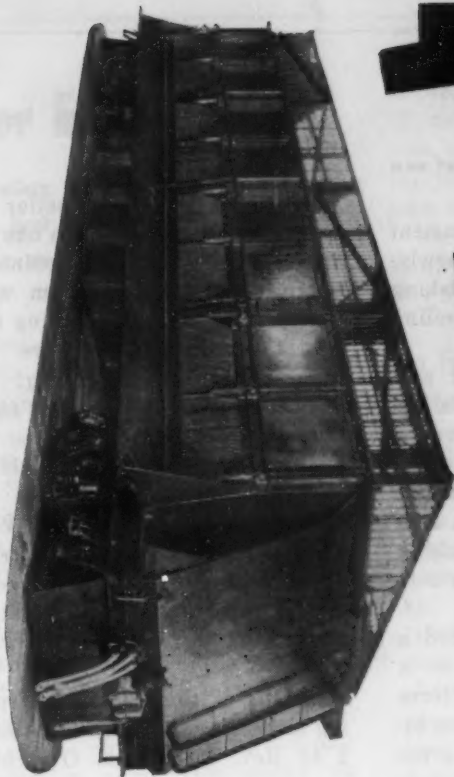
Before the new plot can be converted to industrial use, J. & L. must find new homes for some 300 families now living in the area.

Why It's Needed—The additional land will be used to provide storage space for 1.6 million tons of iron ore, space for coal storage, truck and rail access and material storage for No. 18 and No. 19 bar mills, possible further extension of byproduct coke facilities, which already are being expanded, new boiler house and extension of the cold-finished bar department, scrap storage, and locomotive repair facilities.

No major new mills are contemplated under present plans. However, J. & L. has been interested in hot extrusion and if such a mill is built it likely would go into the area to be acquired.



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Controls

FREIGHT:

Firms selling to government get new f.o.b. ceilings by zone.

Firms selling to the government are expected to be aided by a newly-announced method for establishing uniform f.o.b. destination ceiling prices by zones.

Using this method, a seller who has determined a ceiling f.o.b. his plant, or a delivered ceiling at a point outside of a zone specified by the buying agency, may set a uniform ceiling f.o.b. destination anywhere within the zone by tacking on the average cost of delivery into the area.

A seller who has established a delivered ceiling applying in a specified zone may set a uniform ceiling for any point in the zone by adjusting his price to reflect aver-

age transportation costs into or within the zone.

Lowest Price—The seller who has established more than one ceiling to cover different points of shipment or delivery from which he can compute a zone ceiling must use the established figure that yields the lowest zone ceiling.

If the government agency names a freight center for the zone, the average transportation cost is the lowest common carrier rate customarily used to the center. When no center is designated, the transportation cost is the average of freight rates to zone destinations requiring the highest and lowest rates.

Details of this ceiling-determining method are set forth in Amend. 2 to Rev. 1, General Overriding

Reg. 2, effective Sept. 5. The amendment was issued primarily to guide sellers of furniture and drafting and office supplies to General Services Administration, but terms apply to broader categories of items.

New Relaying Rail Prices Asked

Dealers in used railroad steel rail classed as suitable for relaying say only a tailored price regulation can prevent situations in which some used rail has a higher ceiling than new material.

In their first meeting with Office of Price Stabilization personnel, representatives of the relaying rail industry pointed out that the General Ceiling Price Reg. fails to uphold a correct relationship between prices of new and used rail.

Transportation

How Your Freight Traveled From 1939-50

YEAR	TOTAL	RAILWAYS *		MOTOR TRUCKS		GREAT LAKES		INLAND WATERWAYS		PIPE LINES	
		Ton Miles (1)	Pct of Total	Ton Miles (1)	Pct of Total	Ton Miles (1)	Pct of Total	Ton Miles (1)	Pct of Total	Ton Miles (1)	Pct of Total
1939	539	335	62.1	43	8.0	76	14.1	20	3.7	65	12.1
1940	608	375	61.7	51	8.4	96	15.8	22	3.6	64	10.5
1941	753	477	63.3	57	7.6	114	15.1	27	3.6	78	10.4
1942	914	641	70.1	50	5.5	122	13.4	26	2.8	75	8.2
1943	1,016	730	71.9	48	4.7	116	11.4	26	2.6	96	9.4
1944	1,072	741	69.1	49	4.6	119	11.1	31	2.9	132	12.3
1945	1,006	684	68.0	56	5.6	113	11.2	30	3.0	123	12.2
1946	876	595	67.9	64	7.3	96	11.0	28	3.2	93	10.6
1947	987	658	66.7	78	7.9	112	11.4	35	3.5	104	10.5
1948	1,010	641	63.5	88	8.7	119	11.8	43	4.2	119	11.8
1949	877	529	60.3	94	10.7	97	11.1	42	4.8	115	13.1
1950	1,010	591	58.5	126	12.5	112	11.1	52	5.1	129	12.8
TOTAL	10,668	6,997	65.6	804	7.5	1,292	12.1	382	3.6	1,193	11.2

SOURCE: Annual Reports of the Interstate Commerce Commission, and Chief of Engineers, U. S. Army.

* Exclusive of mail and express traffic.

(1) In billions.

NET TOTAL WATER-BORNE COMMERCE OF THE UNITED STATES (In tons of 2000 pounds)

YEAR	FOREIGN	COASTWISE	GREAT LAKES	INLAND
1947	188,256,115	153,098,204	163,180,337	262,282,079
1948	182,971,591	174,080,850	172,490,721	183,657,303
1949	165,358,281	161,430,862	145,591,636	268,338,392
1950	169,224,695	182,542,552	169,879,433	297,696,209

OUR NATIONAL TRANSPORTATION SYSTEM

Airways	(Trunk lines and local service lines.)	161,678 miles.
Highways	(Paved roads.)	1,800,000 miles.
Inland Waterways		28,383 miles.
Pipelines	(Oil and gas.)	260,000 miles.
Railroads	(Mainline right-of-way.)	224,500 miles.

NICKEL: Little Chance for Easing

NPA doubts it will be able to relax curbs for at least another year . . . Supplies increase, but defense program needs offset gains . . . Jet engines use more—By A. K. Rannells.

Relaxation of controls over nickel or lifting of any current ban on its use for non-defense production must be counted out for at least another year, according to current thinking at National Production Authority.

Manufacturers have been reporting that it is getting tougher to cash CMP stainless steel tickets for making permitted consumer durables. But most they can expect in the near future is slight changes in allocations.

Great strides have been made in nickel conservation by such industries as construction and farm machinery, thereby cutting down on civilian consumption.

One of the bigger implement manufacturers, for instance, is now using 75 pct less nickel than formerly. Another has reduced use of nickel in crawler-type tractors by 77 lb per unit.

Conservation has also been reported by the Defense Dept., where the services say cutbacks in consumption amount to 2.5 million lb a quarter.

From Cuba — In addition, between 30,000 and 45,000 tons of new supplies are expected to result eventually from reopening of the Nicaro (Cuba) plant and from several long-term purchase contracts negotiated by the government.

On the surface, this seems to indicate an improving supply. But, production officials say, such apparent improvement is only an illusion. Any gains have been more than offset by rising defense and atomic energy requirements.

Reasons for the tight supply are not hard to find and may be charged to a large degree to military aircraft production.

Most recent report for public consumption showed that at the end of first half, 1952, military aircraft

deliveries were in excess of 800 a month—more than double the pre-Korean rate.

Jet Needs—These include jets—the Stratojet medium bomber, the Sabrejet, the Thunderjet, the Banshee, and others. Motors for these craft require up to 2400 lb of nickel per engine unit.

Pre - Korean consumption of nickel for all purposes is given as slightly over 100,000 tons annually. This was during the infancy of the jet engine development. Jet motor production alone now chews up more nickel than this figure.

High Alloy Scrap Put on Quotas

High alloy scrap has been placed under allocation by inclusion in Sec. 5 of M-20, effective Sept. 4.

Under the amendment, National Production Authority is permitted

to direct the manner and quantity of delivery, to decide permitted uses, and to issue specific directives for the acquisition or delivery of such scrap.

Under the definition, high alloy scrap includes all scrap containing less than 50 pct iron or steel.

No Foreign Copper Price Change

Manufacturers of brass mill and copper wire mill products will not have to recalculate ceiling price adjustments covering foreign copper costs before Dec. 1.

Amendments to Ceiling Price Regs. 68 (brass mill products) and 110 (copper wire mill products) on July 1 allowed producers to raise their ceilings to reflect higher cost of foreign copper. At that time, the government expected a recalculation of adjustments would be needed as of Sept. 15, to take effect Oct. 1.

However, foreign copper for October - November delivery reportedly is still being bought at 36½¢ per lb, or the same price now used in determining adjustments. This eliminates necessity for making an immediate recalculation.

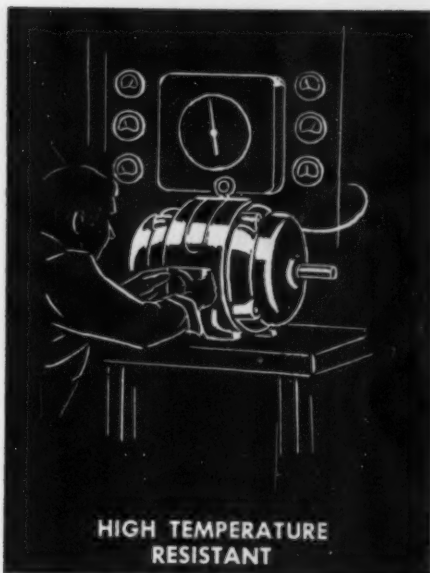
IRON & STEEL: June Output By Districts

As Reported to the American Iron and Steel Institute

DISTRICTS	BLAST FURNACE —NET TONS	Number of Companies	Annual Capacity	PIG IRON		SPIEGEL, FERRO- MANGANESE		TOTAL			
				June	Year to Date	June	Year to Date	June	Year to Date	Pct of Capacity	
										June	Year to Date
Eastern.....	12	13,983,580	177,310	5,695,703	8,637	143,848	185,947	5,839,551	16.2	83.9	
Pitts.-Youngstn....	17	27,468,600	322,356	11,017,093	1,848	115,489	324,204	11,132,582	14.4	81.5	
Cleve.-Detroit....	6	7,501,100	133,250	2,969,020			133,250	2,969,020	21.8	79.6	
Chicago.....	7	15,703,740	212,737	8,116,489			212,737	8,116,489	10.5	79.3	
Southern.....	8	5,646,620	121,420	2,374,668	1,516	28,701	122,938	2,403,366	26.5	85.5	
Western.....	3	3,476,700	89,205	1,448,034			89,205	1,448,034	31.3	83.7	
Total.....	35	73,782,340	1,056,278	29,621,004	12,003	288,038	1,058,281	29,909,042	17.6	81.5	

DISTRICTS	STEEL —NET TONS	Number of Companies	Annual Capacity	TOTAL STEEL (Incl. Alloy Steel, Carbon Ingots)				ALLOY STEEL		CARBON INGOTS	
				June	Year to Date	Pct of Capacity		June	Year to Date	June	Year to Date
						June	Year to Date				
Eastern.....	23	21,709,870	258,762	8,891,569	14.5	82.3	28,802	707,282	43,404	x1,827,285	
Pitts.-Youngstn....	33	42,350,760	681,802	17,488,788	19.6	83.0	109,537	2,523,626	47,676	2,053,421	
Cleve.-Detroit....	6	10,485,380	197,675	4,385,873	23.0	94.1	17,469	305,216	17,256	457,905	
Chicago.....	15	22,258,500	296,536	9,257,115	16.2	83.6	19,345	705,211	51,344	1,406,931	
Southern.....	11	5,291,260	34,493	2,212,674	7.9	84.1	1,239	33,269	191	8,097	
Western.....	12	6,491,900	170,223	2,796,428	32.0	95.6	8,242	61,194	9,085	201,116	
Total.....	80	108,587,670	1,639,491	45,032,747	18.4	83.4	184,634	4,335,798	168,958	x5,954,795	

x Revised.



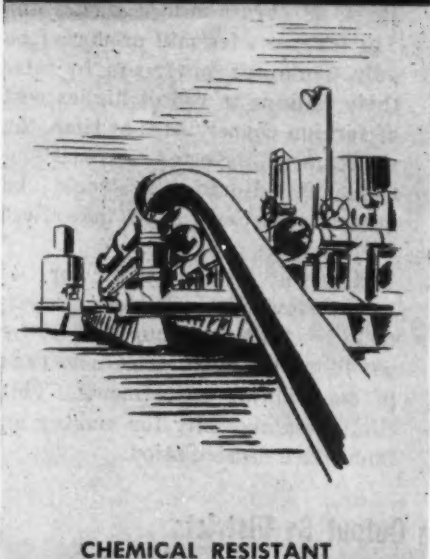
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RESISTANT**



**LOW TEMPERATURE
RESISTANT**



OIL and GAS RESISTANT



CHEMICAL RESISTANT

PRECISION RUBBER PARTS *By Stalwart!*

If you have a rubber part problem, see STALWART first! Leaders in the mass production of custom-engineered rubber parts, they can meet your individual requirements quickly and economically.

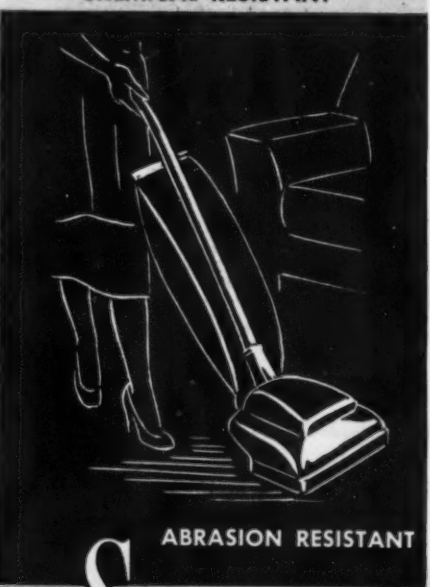
From more than 500 specially-developed stocks, including extreme temperature resistant Silicones, STALWART can fabricate precision molded, extruded, die-cut and machine or hand-cut parts. These parts will retain their desirable physical, chemical and dielectric properties under severe operating conditions and will give maximum performance in each specific application.

Let STALWART solve your rubber parts problems. Submit the specifications and STALWART will do the rest.

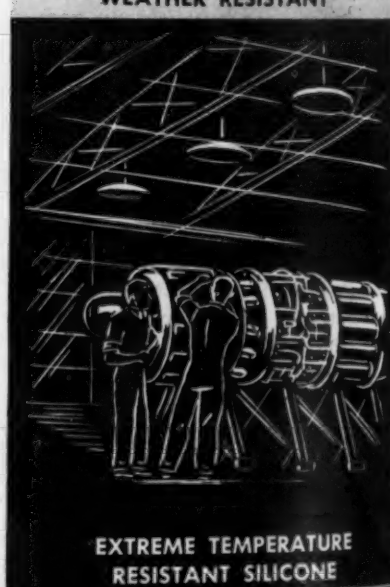
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WEATHER RESISTANT



ABRASION RESISTANT



**EXTREME TEMPERATURE
RESISTANT SILICONE**

STALWART RUBBER COMPANY

200 NORTHFIELD RD. • BEDFORD, OHIO

Building Equipment Curbs Eased

Both operators and manufacturers of construction machinery have been authorized to use their own ratings for procurement of several types of parts and components needed for repair and replacement.

Amended National Production Authority order M-43 regroups a number of items in a new Part II of List A and exempts them from the ratings imposed on the Part I list.

Aluminum Inventory Curbs Eased

Fourth-quarter inventory ceilings of aluminum controlled materials have been raised from the previously 45-day to a 60-day (calendar) level under an amendment to CMP Reg. 2, effective Oct. 1.

At the same time, National Production Authority revoked Dir. 1 to Reg. 2, which had temporarily suspended inventory limitations on aluminum and copper controlled materials during the period of the steel strike.

The practical working inventory provision still applies if such level is less than the 60-day limit. Materials must also be regarded as "inventory" until put into use.

Industry Controls This Week

Prices—GOR 35, permits manufacturers to pass along higher metals costs, eff. Sept. 10.

Alloy Scrap—Amend. 1, Sched. 5, M-20 establishes allocations of high alloy scrap.

Aluminum—Amend. CMP Reg. 2 and Revoc., Dir. 1, CMP Reg. 2 ease aluminum inventory curbs.

Class "B" Allotments—Amend. 1, Dir. 18, CMP Reg. 1 clarifies automatic allotment procedure for "B" product manufacturers.

Construction Machinery — Amend., M-43 permits self-authorization of orders for repair and replacement parts by construction machinery manufacturers and owners.

Defense Contractors — Amend. 1, Rev. 1, GOR 2 suspends requirement that defense contractors and sub-contractors state ceiling prices in contract sales to the government.

Electric Utilities—Revoc., Dir. 1, M-50 imposes 90-day limitation on electric utilities' inventories of copper and aluminum.

Graphite—Dir. 1, M-66 provides fourth quarter allocations for delivery of artificial graphite and carbon electrodes.

Nickel—Amend., Sched. 1, M-80 allows electroplaters to use nickel in a strike of up to an average thickness of 0.00005 in. for protective purposes.

Pig Iron—SR 116, GCPR grants a ceiling price increase of approximately 4.7 pct on pig iron delivered on or after July 26.

Pipe—Dir. 4, M-46 and Dir. 2, M-46A permits placement and acceptance of

third quarter authorized controlled materials orders for oil well casing, tubing and drill pipe even though they call for delivery in the fourth quarter.

Rubber — Amend. M-2 removes restrictions on purchases of government-produced cold synthetic rubber.

Steel—Dir. 19, CMP Reg. 1 and Dir. 7, CMP Reg. 6 place restrictions on purchase and use of carbon conversion steel. Amend. 1, Dir. 16, CMP Reg. 1 clarifies the position of third and fourth quarter orders on steel producers' schedules.

Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Engine spares bearings and piston rings, 236444 ea, \$209,832, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Engine parts, 5270 ea, \$28,375, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Engine parts vane weldments and tube assys, 9625 ea, \$1,341,076, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Tube assys for R-4360-53 engines, 37660 ea, \$162,052, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

P & W spare parts bearings assys, etc., 87161 ea, \$102,091, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Spare parts for support of engines, 154270 ea, \$250,541, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Maintenance propeller parts, 200 ea, \$300,000, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Jet engine tools, 665 ea, \$587,027, Westinghouse Elect. Corp., Philadelphia, W. C. Wilson.

H. S. propeller parts, 664 ea, \$1,025,243, United Aircraft Corp., East Hartford, Conn., *Adam C. Wolk.*

Engine spare parts, 548046 ea, \$2,453,493, United Aircraft Corp., East Hartford, Conn., *E. E. Champion, C. R. Skinner.*

Carbide tips, 65000 ea, \$74,180, Johnson-deVou, Inc., Cambridge, Mass.

Metal parts for shell, 28000 ea, \$52,158, William Brower Mch. Co., Hartford.

Mobile machine shop trailers, 25, \$649,447, Boyertown Auto Body Works, Inc., Boyertown, Pa.

Steam-cleaning trailers, 242, \$241,637, Homestead Valve Mfg. Co., Coraopolis, Pa.

Repair parts for centrifugal pumps, 1311, \$48,877, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Repair parts for pumps, 3390, \$30,081, Gardner Denver Co., Quincy, Ill.

Repair parts for electric motor controls, 22709, \$45,452, Cutler Hammer, Inc., Milwaukee, Wis.

Bearings, 74, \$26,756, Lucian Q. Moffitt, Inc., Akron.

Metal parts for shell, 222500, \$407,056, Monroe Auto Equip. Co., Monroe, Mich.

Maintenance parts for use on J40-WE22 engines, 1289 ea, \$622,791, Westinghouse Elect. Corp., Philadelphia, W. C. Wilson.

Carrier, cargo, amphibious, 196 veh, \$16,733,293, General Motors Corp., Pontiac, Mich., *M. F. Rummell.*

Gliding metal rotating bands for 105 MM shell, 2430000 lbs, \$1,215,000, Canadian Commercial Corp., Washington, D. C., or Ottawa, Canada.

Cups, cartridge-case brass, 4000000 lbs, \$1,664,600, Canadian Commercial Corp., Washington, D. C., or Ottawa, Canada.

Shell, HE, 90MM, M71, 640000, \$3,484,988, Gibson Refrigerator Co., Greenville, Mich.

Engine Assy, 335, \$2,696,939, Continental Motors Corp., Muskegon, Mich.

Engine, w/accessories, 377, \$476,320, International Harvester Co., Detroit.

Replenishment of motor vehicle parts, 8100 ea, \$32,157, General Motors Corp., Pontiac, Mich., *J. P. McManus.*

Replenishment of motor vehicle parts, 36070 ea, \$61,560, Detroit Aluminum & Brass Corp., Detroit.

Replenishment of motor vehicle and tank & combat vehicle parts, 2250 ea, \$44,698, Federal-Mogul Corp., Coldwater, Mich.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Yards & Docks Supply Office, Port Hueneeme, Cal.

Repair parts for caterpillar tractors, 537 itm, 537/53, Sept. 12.

Repair parts for caterpillar tractors, 487 itm, 466/53, Sept. 12.

Heaters steam, 118 ea, 336/53, Sept. 25.

Heaters, water steam, 120 ea, 342/53, Sept. 25.

Heaters, water, 195 ea, 337/53, Sept. 25.

Heaters, water steam, 1097 ea, 341/53, Sept. 25.

Heaters, water, 382 ea, 340/53, Sept. 25.

Navy Purchasing Office, Washington, D. C.

Box, socket wrench, 3345, 6680 B, Sept. 15.

Rock Island Arsenal, Rock Island, Ill.

Block, 7200 ea, 11-070-53-90B, Sept. 19.

Block assy, 14400 ea, 11-070-53-90B, Sept. 19.

Base, 7200 ea, 11-070-53-90B, Sept. 19.

Plate, 7200 ea, 11-070-53-90B, Sept. 19.

Columbus General Depot, Columbus, Ohio.

Cover assy, 425 ea, 53-75B, Sept. 15.

Carrier, 50 ea, 53-75B, Sept. 15.

Clutch assy, 455 ea, 53-75B, Sept. 15.

Disc assy, 150 ea, 53-75B, Sept. 15.

Cover, 225 ea, 53-75B, Sept. 15.

Spacing set, 500 ea, 53-75B, Sept. 15.

Sleeve, 125 ea, 53-75B, Sept. 15.

Bracket, 175 ea, 53-77B, Sept. 16.

Cover assy, 20, 53-77B, Sept. 16.

Case, 85 ea, 53-77B, Sept. 16.

Cover, 150 ea, 53-77B, Sept. 16.

Case assy, 80 ea, 53-77B, Sept. 16.

Flange, 155 ea, 53-77B, Sept. 16.

Fork, 175 ea, 53-77B, Sept. 16.

Gear, 240 ea, 53-77B, Sept. 16.

Lever, 60 ea, 53-77B, Sept. 16.

Link assy, 350 ea, 53-77B, Sept. 16.

Lever assy, 325 ea, 53-77B, Sept. 16.

Nut, 630 ea, 53-77B, Sept. 16.

Retainer, 50 ea, 53-77B, Sept. 16.

Ring snap, 120 ea, 53-77B, Sept. 16.

Arm, 165 ea, 53-78B, Sept. 17.

Bushing, 650 ea, 53-78B, Sept. 17.

Brace, 125 ea, 53-78B, Sept. 17.

Cover, 120 ea, 53-78B, Sept. 17.

Cap, 610 ea, 53-78B, Sept. 17.

Case, 70 ea, 53-78B, Sept. 17.

Countershaft, 35 ea, 53-78B, Sept. 17.

Available

for the first time...

**a Full-Color
Sound Film**

**STEEL
WITH A
THOUSAND
QUALITIES**



Scientific schools and groups of designers, engineers, metallurgists and technical societies can now secure the free use of this full-color sound film, the first produced in the steel foundry industry. Available in 16 mm prints, the film is a 37-minute tour of the modern plant of Lebanon Steel Foundry. The camera follows jobs from the blueprints on the project engineer's desk through steps of production to show, finally, a few of the many important uses of Lebanon quality Steel Castings. Write for information on this exciting and educational film.

LEBANON STEEL FOUNDRY
Dept. A, Lebanon, Pa.
In the Lebanon Valley

LEBANON
ALLOY AND STEEL
castings



Industrial Briefs

Production Started — AMERICAN BRAKE SHOE CO. has started production at its new steel forging plant in Azusa, Calif., operated by the Am-Forge Div. It is expected to produce 1000 to 1200 tons of forgings per month.

Contract Awarded—A contract for a high-speed 4-high rolling mill installation for the manufacture of aluminum foil has been awarded Loewy Rolling Mill Div. of HYDROPRESS, INC., New York.

Plant Addition—GENERAL MOTORS DIESELS LTD., will build a \$2.5 million plant addition at London, Ont. This will be the second expansion since the plant was opened in 1950.

Appointment—James H. Lowe has been appointed product development director of STEEL FOUNDERS' SOCIETY OF AMERICA, Cleveland.

Receives Contract — BLAW-KNOX CONSTRUCTION CO. has received a contract from Swift & Co. to modernize and expand their soybean processing facilities at Fostoria, Ohio.

New District Office—F. J. STOKES MACHINE CO. has established a new district office at 2904 Woodburn St., Cincinnati.

Division Formed—AMERICAN CAR & FOUNDRY CO. has formed an aircraft div. Clifford W. Sponsel is vice-president of the new division.

Valuable Knowledge—Idea of a fleet of mobile units put on the road by MILLER MOTOR CO., Chicago, is to instruct users in the proper use, maintenance, operation and testing of air and hydraulic cylinders in order to obtain the greatest possible efficiency and service life.

Activities Transferred — Engineering Development Div. of RHEEM MFG. CO. has transferred their activities to Philadelphia. This new location is the former Cramp Shipyard located at Richmond and Norris Streets.

Strike Effects—The second quarter report issued by YOUNGSTOWN SHEET & TUBE CO., Youngstown, showed gross income dropped nearly 35 pct. This was due to effects of the nation-wide steel strike.

Moving Soon — AIR-MAZE CORP., Cleveland, will move soon to its new \$1.5 million plant in Bedford Heights.

Division — The Industrial Equipment Corp., formerly of 910 First National Bank Bldg., Pittsburgh, is now operated as the Industrial Equip. Div. of L. B. FOSTER CO.

New Tube Plant—WESTINGHOUSE ELECTRIC CORP. has completed all building construction for the new electronic tube plant and division headquarters in Elmira, N. Y.

Conference — INSTRUMENT SOCIETY OF AMERICA is holding its Seventh National Instrument Conference and Exhibit in Cleveland, Sept. 8-12, in the Public Auditorium.

Construction Completed—Construction of the new 15,500 sq ft plant and administrative building of ELECTRIC REGULATOR CORP., in Norwalk, Conn., has been completed.

Distributor Named—J. N. Fauver Co., Dayton, has been named distributor for THE PARKER APPLIANCE CO.

Record Production—Clairton Works, U. S. STEEL, chalked up an all-time high for steel output in 1 month. The plant's production of openhearth steel ingots soared to a record 83,382 tons.

Representative Appointed—WIEDEMANN MACHINE CO., Philadelphia, has appointed Four States Machinery Co., their representative.



"Well, I hope you enjoy your work here, Barnes. But just remember the blonde of the first typewriter is mine."

PATTERN SHOPS AT MESTA



Expert craftsmen have every facility for making patterns of any size or intricate shape in Mesta's modern Pattern Shops.

Illustration at right shows the pattern for a 12,000 ton forging press cast steel cap.



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

Wire Wheels On Their Way Back

Success of sport cars shows demand for wire spokes . . . Optional equipment on some '53 models . . . Have engineering advantages, too . . . Manufacturing has woes—By R. D. Raddant.

Rolling back onto the highways is the old wire wheel. Forgotten by all but our elders their revival is one of the most remarkable trends in the automotive industry.

It can be traced to the success of the more flashy car stylings which indicate there may be sleeping demand for wire wheels on some of the plush models in 1953.

wheel equipment, dismantled its wire wheel shop, and practically forgot about them. However, enough veterans remained so the sudden demand in the past months didn't catch them completely unprepared.

Production Problem—Big problem, of course, is tooling up for a

Answer is that they will probably never be offered by all auto manufacturers. Cost is the main problem. There is no possible way to make a wire wheel competitive in price with the conventional wheel.

This would tend to eliminate them from lower priced cars. However, one of the biggest manufacturers has shown more than casual interest.

The major interest is shown by manufacturers of big cars. Buick, Packard, Lincoln and Chrysler may have them in 1953. A Cadillac sporting wire wheels carried Mrs. Eisenhower when she and the General were in Detroit recently.

Good Reasons—Actually, wire wheels aren't 100 pct for show. There are sound engineering reasons for them.

A major factor is that they provide better heat dissipation from the brake drums, an increasingly important point, particularly among heavier cars with larger brakeloads.

A second point is improvement in cutting road noise, an important competitive factor, again, among the more expensive cars. Engineering improvements have cut engine sounds to the point where road noise is the most troublesome sound factor and wire wheels are said to cut this considerably.

Labor—Throughout 1952, the Detroit employment situation has been one of extremes.

At the height of steel strike layoffs in July, more than 185,000 were jobless within the metropolitan area. Today the Michigan Employment Security Commission labels Detroit a "tight labor market."

Up-to-the-minute figures are unavailable because they are based on the level at the 15th of each month. However, the rapid recovery from the steel strike is indicated by the drop in unemployment from the July high point to

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Sept. 6, 1952	88,118*	21,887*	110,005*
Aug. 30, 1952	100,065	22,567	122,632
Sept. 8, 1951	80,276	22,948	103,224
Sept. 1, 1951	106,094	31,385	137,479

*Estimated

Source: Ward's Reports

Tipoff on the trend is that almost without exception the ultra-modern sports cars shown by auto makers this year had wire spokes.

But having wire wheels as optional equipment on 1953 cars isn't so simple as it sounds. Making the wheels, a tricky manufacturing process in itself, was virtually a lost art. Besides, styling and engineering changes since they were in vogue made old prints obsolete.

Dormant—Wheel makers have to admit that when model wire wheels were ordered by auto companies last year, rims and shells had to be sent to Italy where wire wheel construction had lingered in European stylings while dormant in the U. S.

"We thought wire wheels were gone forever," remarked Charles Sinclair, chief engineer of Kelsey-Hayes Wheel Co. "Our last ones were produced for Ford in 1935."

In the intervening 17 years, Kelsey-Hayes had scrapped its wire

new shop. At the moment, most wire wheels are made without the tools needed for mass production. Dies for the shell stampings had to be developed. Machines to drill the 40 spoke holes for the shells and rims had to be designed. Piercing equipment to "bubble" the rims had to be engineered.

There are three possible designs for wire wheels. They can be either riveted, welded, or of nipple design. The nipple design so far is the most successful.

Wheel designers found the biggest job was in adapting the wire wheel concept to the present car design. Because the brake drums go into the wheel itself, where formerly they were outside the wheel toward the center of the car, a completely new design was necessary.

How Much—Big Question: How large a factor will wire wheels be in wheel production of the next few years?

65,000 jobless Aug. 15. This figure, of course, has dropped to probably less than half as of today.

High Output—Tightness of the labor market is attributed to the automotive industry's accelerated production rate which hit a yearly high point at the end of last week. Several plants are having trouble obtaining help for second shifts as they attempt to get production to better than pre-strike levels.

Shortages in highly skilled labor in machinists and tool makers is not new, but it has been some time since unskilled workers were not a surplus in Detroit. It should be remembered that only last winter Detroit was a critical area in terms of unemployment.

Famine of skilled workers has been accentuated by production boosts to a point where it may impede new car production. Even during the height of the steel strike, skilled workers had no trouble finding work in outlying shops while they rode out the storm.

Labor Cool to Stevenson Talk

Repercussions of Gov. Adlai Stevenson's Labor Day address in Detroit still linger.

They don't stem from his calling for the repeal of the Taft-Hartley Act. That was expected. They stem from his sober reminder to labor, both rank and file and the hierarchy, that it must accept definite responsibilities.

From his opening statement ("You are not my captives and I am not your captive") he made it clear that he was offering labor no blank check in this campaign. Instead, he implied that labor had no favored position but would be considered along with agriculture and business in consideration of "what I think is right and best for all of us."

This attitude, made on Labor Day at the invitation of labor in a labor stronghold, aroused something less than enthusiasm from leaders flanking him on the rostrum. UAW (CIO) President

Walter P. Reuther, for example, indulged in only perfunctory applause throughout the address.

Nevertheless, it was far from an antilabor speech. It lost him no support from the top, strengthened his hand in the ranks, and was aimed directly at the middle of the road group. Whether he hit the mark on y time will tell.

SCREEN TEST:

Oldsmobile uses high-speed movies to study Rocket valve lifters.

High-speed movies are being utilized at Oldsmobile to study operation of valve and valve lifters in the high compression Rocket engine. The camera, operating at speeds as high as 15,000 frames, provides the first valid check on valve operations. Without the camera, engineers were forced to rely on trained judgment and visual operation to check valve operations.

In the high compression engine, the timing of the valves is all-important in insuring correct fuel

mixture and ignition necessary for best performance.

Along with the motion picture camera, Oldsmobile engineers use a wire sound recorder to compare noise levels of camshafts and to determine which type under study gives the quietest performance.

In viewing a film of valve operations, Oldsmobile engineers use a special projector with a counter to locate frames in relation to an original reference point. From this film, they are able to plot a performance curve of the actual valve in the engine and compare it with the theoretical curve of perfect valve performance.

Detroit Steel Winds Up RFC Loan

Detroit Steel Corp. announced the consummation of the \$45 million Reconstruction Finance Corp. loan authorized last June. M. J. Zivian, president of Detroit Steel, said that the initial take-down under the loan was used to retire the company's first mortgage bonds due Feb. 1, 1965.

THE BULL OF THE WOODS

By J. R. Williams



Helpful hints for topnotch performance

FROM YOUR

CINCINNATI HYDRO-TEL MILLING MACHINES

For an indefinite period of time, you can easily maintain the dependability of the CINCINNATI Hydro-Tel Milling Machines in your shop. Here are a few precautions which you should keep in mind:

1) **LEVELING** Keep the machine level; you will be well repaid in accurate work and smoother cutting. Built-in leveling jacks are provided for this purpose.

2) **LUBRICATION** of your CINCINNATI Hydro-Tel Milling Machine is principally automatic, but even so, it cannot be neglected. Way oil is especially important. Be sure to follow the recommendations in the instruction book.

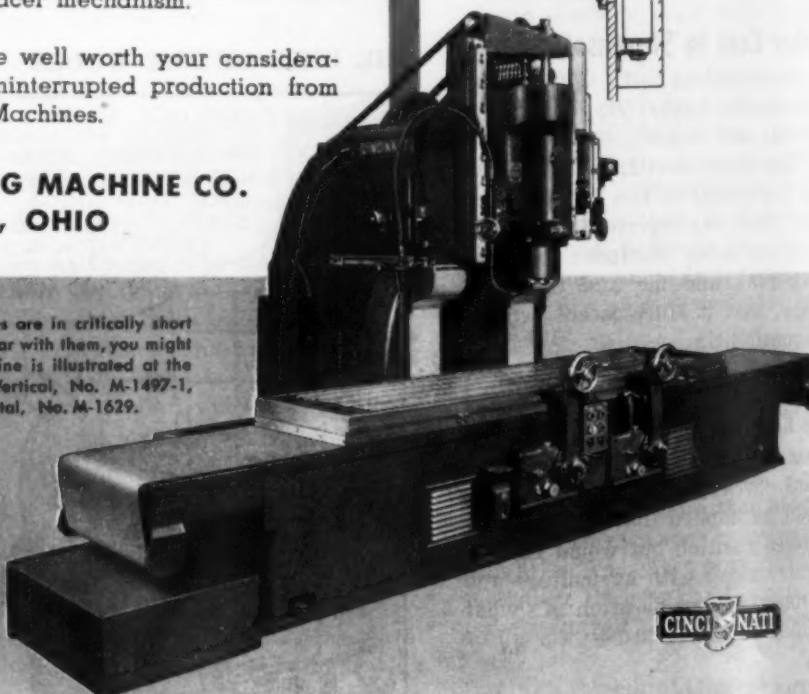
3) **HYDRAULIC SYSTEM AND FILTERS** Hydraulic oil gives your Hydro-Tel life; use a good grade. Oil must be **CLEAN—CLEAN—CLEAN**. Three types of filters are included in the hydraulic circuit. Inspect and clean them periodically. If tracer mechanism does not work smoothly, filter all the oil through an independent, portable oil filter. When draining the hydraulic oil tank, squeegee sludge from reservoir; do not use rags; avoid splashing and turbulence when refilling.

4) **FEED RATES FOR DIE SINKING** Power table or cross feed rates for die sinking operations, when tracing up and down steep surfaces, depend upon the angle of the surface being traced; max. 1½" per min. for 85°, 10" for 60°, etc. Follow the recommendations in the instruction book; go slowly to avoid breaking the cutter or damaging the work or tracer mechanism.

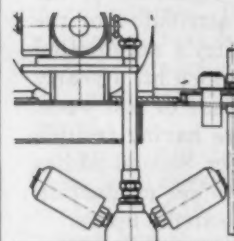
The above preventive measures are well worth your consideration; they will help you obtain uninterrupted production from your CINCINNATI Hydro-Tel Milling Machines.

**THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO**

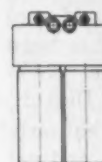
P.S. CINCINNATI Hydro-Tel Milling Machines are in critically short supply at this time, but if you're not familiar with them, you might like to have literature. 28" Vertical Machine is illustrated at the right. Write for these catalogs: 16" Vertical, No. M-1497-1, 28" Vertical, No. M-1284-3, 36" Horizontal, No. M-1629.



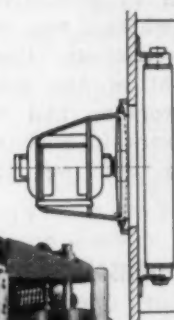
Hydraulic oil filter—this one is accessibly located outside the rear base.



Hydraulic oil filter—a V-6 battery located in the oil reservoir.



Hydraulic oil filter—a four-cartridge unit, accessibly located outside the rear base.



Filtered air cools the hydraulic pumps. Air filter is accessible for cleaning.

CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

Try Again for U.S.-Built War Plants

**DPA lays groundwork for new drive to get U. S. war plants . . .
NPA forced to postpone stockpiling aluminum . . . Split control of Congress may be President's grief—By G. H. Baker.**

A new bid for federal authority to build—and possibly operate, as well—war plants is being readied for presentation to the new Congress in January.

Defense Production Administration, long an enthusiastic sponsor of the idea that “national defense requirements” necessarily mean that Washington should be permitted to run certain war industries, has begun laying the groundwork in its new campaign for such authority.

Only Military—Since the end of World War II, Congress has turned down a number of Administration-backed requests for wide and sweeping authority to enter into virtually any type of defense production.

New bid, however, is to be confined to a specific request for authority to build and operate only certain designated plants. Exact nature of these projects has not yet been made public. It is known, however, that they would be primarily military in nature.

Aluminum Stockpile—Continued strong demand for aluminum by manufacturers of both military and civilian products and lost production because of water power shortages (see p. 111) is forcing the government to postpone its scheduled build-up of aluminum stockpiles.

National Production Authority is now preparing to concur in industry recommendations that any resumption of aluminum stockpiling be deferred until first-quarter 1953—at the earliest. Government stockpiling of aluminum was suspended late last year because of mounting demand from defense and civilian goods fabricators.

And the steel strike has not resulted in any lessening in demand, NPA is informed by industry spokesmen.

Split Congress — Popular tendency of many businessmen to think of next year's Washington administration as either Democratic or Republican is obscuring the very real possibility that control of the Congress may be split between the two political parties.

A Democratic Senate and a Republican House, for example, is regarded by some observers as a likely prospect.

One important result of such a development would be the blocking by one party of all principal bills—including controls, taxes, and military legislation—sponsored by the other. And the stalemate would continue until January, 1955—the earliest date at which new elections could effectively alter the composition of either Senate or House.

Democratic Senate—Regardless of which political party succeeds in gaining control of the White

House, there is the definite possibility that the Senate will be controlled by Democrats next year.

This situation could come about because 20 Republican senators are up for re-election in November, and at least 11 of this number face the toughest kind of opposition. Yet, to win control of the Senate by a bare majority, the Republicans must hold all the seats they have and must gain three more seats.

Tug of War—Members of both political parties concede gloomily that the next occupant of the White House would have plenty of grief on his hands with a split Congress. On all legislation except proposals related to a true national emergency or those related to trivial, uncontested suggestions, the activities of one law-making chamber would very likely be nullified by the other.

This would mean, in effect that business, industry, and the public could expect few changes in the broad pattern of federal regulation that has come into being in recent years. Basic changes, however necessary they might appear, may be postponed for at least two years and the election of another Congress.

New Job — Henry H. Fowler took on the job of Administrator for Office of Defense Mobilization in addition to his present post of Defense Production Administrator.

He will not relinquish the post of director of DPA until he determines whether it is feasible to merge the activities of that agency with ODM.

However, he resigned as head of the National Production Authority on taking over the ODM post since NPA is and has been actually under the Commerce Dept. A successor was to be named this week.

Mr. Fowler will retain the post of National Mobilization Director until the end of 1952—when he says he will leave government service.



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COAL: Washington Watches for Strike

Government will intervene in coal dispute only if strike is a long one . . . Coal stockpile is immense, mounting to 80 million tons . . . Lewis may seek strength for welfare fund.

Fact that Washington has yet to take official notice of the threatened anthracite and bituminous coal strikes doesn't mean that the government's production-control agencies intend to keep their hands off these vital industries.

But federal intervention is likely only in the event of a long strike. Meanwhile, key mobilization officials are keeping a sharp eye on this week's negotiation talks. They are aware that northern soft coal miners will be free to strike on Sept. 22, and that southern soft coal mines and anthracite mines may close down on Sept. 30 unless John L. Lewis and the two industries soon compromise their differences over the amount of royalty payments and employment conditions.

Wait and See—For the time being, Washington does not intend to step into the coal controversy. A "wait-and-see" policy has been unofficially adopted by the Office of Defense Mobilization, Defense Production Administration, and National Production Authority. At the Defense Dept., however, officials are more outspoken in their concern. They see the threatened coal strike as having "a very harmful effect" upon defense production.

They point out that industry generally has not recovered fully from the effects of the steel strike, and that a nationwide coal walk-out would only multiply existing lags in defense output. Clearly, complete recovery of the nation's war industries would be postponed again if a coal strike should extend well into the end of the year.

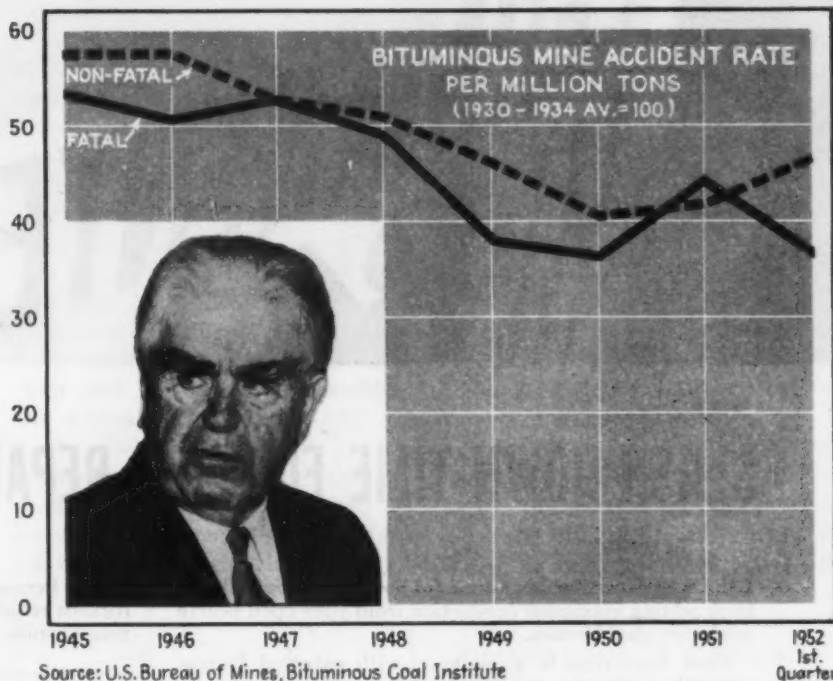
Only bright spot on this otherwise dark labor horizon is the vast coal stockpiles that dot the

industrial East. Stocks of bituminous coal currently are at their second highest level in 10 years.

Period of Grace—High point was reached on July 1, when supplies in the hands of industrial consumers and retail dealers mounted to 80,744,000 tons. Based on the July rate of consumption, this means industrial and resi-

Washington yesterday to compare notes with Joseph E. Moody, their association president and chief negotiator. Northern operators held a similar meeting in Pittsburgh yesterday with Harry Moses, their top negotiator. And anthracite owners met recently in Wilkes-Barre, Pa.

Control Output—In addition to boosting the present 30¢-per-ton royalty to 50¢, Lewis also is reported to be demanding a "spread-the-work" plan for both the bituminous and anthracite industries. He points out that miners in some localities work only 2 or 3 days each week, while



Source: U.S. Bureau of Mines, Bituminous Coal Institute

dential furnaces could be kept going for 85 days after the beginning of a strike. But higher rates of consumption in September and October are expected to shorten this period of grace.

Industry huddles called for this week to discuss the new Lewis demands (reported to include a 50¢-per-ton royalty payment and industry-wide programming of mine employment) are taking place in different corners of the negotiating arena.

Southern coal producers met in

others are enjoying steady, 5-day work-weeks. Under this plan, each mine's output would be strictly regulated by new labor-management contracts.

There has been little or no talk of increasing the existing wage rates. Lewis' principal concern is the shaky financial condition of the Miners' Welfare Fund. Long considered by insurance authorities to be actuarially unsound, the Fund has been drained by retired and disabled miners at an alarming rate in the past 18 months.



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Power Shortage Hits Pot Lines

Lack of water forces northwestern aluminum plants to cut output earlier than usual . . . Bonneville shuts off 300,000 kw to pots . . . Metal loss 395 tons daily—By T. M. Rohan.

The northwest aluminum industry was having its ups and downs last week. In the midst of expanded capacity announcements and commencement next spring of an ultimate \$700 million Alcoa plant in Alaska, the annual Bonneville power shortage came earlier than usual to cut aluminum production.

At an open house in its Longview, Wash., plant Reynolds announced capacity increased considerably by "stretching" the plants' 572 pots. The Longview plant, opened in 1941, has produced 573 million lb. And R. S. Reynolds, Sr., board chairman, said in a short time western plants would be doing considerable aluminum fabrication. He said further Longview expansion must wait until the end of the national emergency.

Alcoa announced it plans to start construction work at its 200,000-ton Alaskan smelting plant (THE IRON AGE, Aug. 28, p. 45) next spring if U. S. and Canadian approval is forthcoming. The proposed plant has been called by Gov. Ernest Gruening of Alaska "the most important event in the territory since its purchase from Russia" and hailed by Seattle civic and industrial officials. Dollarwise it will be Alcoa's costliest and biggest plant.

Low Water—At Portland, Ore., however, low water in the dams forced Bonneville to cut off 300,000 kw of interruptible power supplies, causing a 33 pct production loss, about 395 tons of aluminum daily. Plants affected are Alcoa at Vancouver, Wash.; Reynolds at Troutdale, Ore., and Kaiser at Spokane. Reynolds' Longview, Wash., plant will not

be affected immediately since it receives no interruptible power until Oct. 1.

Losses will also be felt in pulp and paper, chlorine and caustic soda, calcium carbide, magnesium and ferroalloys.

During shortages most producers "juggle" the voltage to keep all pots going at reduced capacity.

Bonneville has a peak demand of 5 million kw, of which 384,000 kw is covered by interruptible power contracts written for the last 5 years to protect the firm load. In that time between 5 and 6 pct power has been lost through shutoffs. The present shutoff will last at least until October and possibly to the end of the year. Early snow melt and lack of rain have made the situation worse than last year and approaching the critical year of 1936-1937.

Ingots From Seattle—Isaacson Iron Works and Seidelhuber at Seattle were back in the ingot business last week with 5000 and

6000-ton orders respectively. The Isaacson order was placed by U. S. Steel Columbia-Geneva Div. which has some excess finishing capacity. Isaacson will operate only one of its electric furnaces in filling this order.

Seidelhuber's order is from an eastern firm and will be used for making badly needed oil well casing. Completed shipment is scheduled for October. Seidelhuber expects it will be the last outside order since they hope to have their rolling mill going in October, for which they have \$4 million in orders.

This is only the third order for Seidelhuber since the 7200-ton furnace was installed early this year. The firm had one domestic and one British order since then. The Isaacson order is the only one for them since the first quarter.

Canadian Furnace — Aroused citizens of Vancouver, B. C., 120 miles north of Seattle, who watch 70,000 tons of 60 pct magnetite iron ore go out monthly from their island to Japan, want a steel furnace of their own.

Last week, C. D. Hobbs, managing director of Vancouver Steel Ltd., Vancouver, which produces merchant and reinforcing bars, said he was planning to put up a 100-ton-per-day electric furnace "in a few years" for smelting the magnetite ore. The original story of plans for an immediate furnace which provoked considerable discussion "were very premature," Mr. Hobbs told THE IRON AGE this week.

He said his firm has invested about \$500,000 in the last 2 years in expansion of its 16 and 12-in. mills and would not undertake an electric furnace project at the present time.

Direct reduction of ore by electric smelting is generally considered a costly and power consuming project. U. S. Bureau of Mines has a small experimental unit near Bonneville dam.

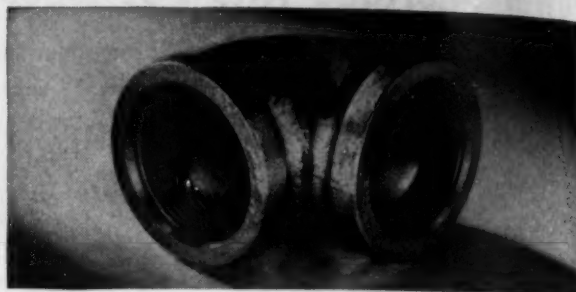


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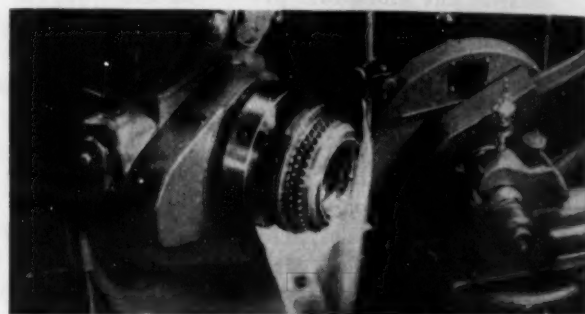
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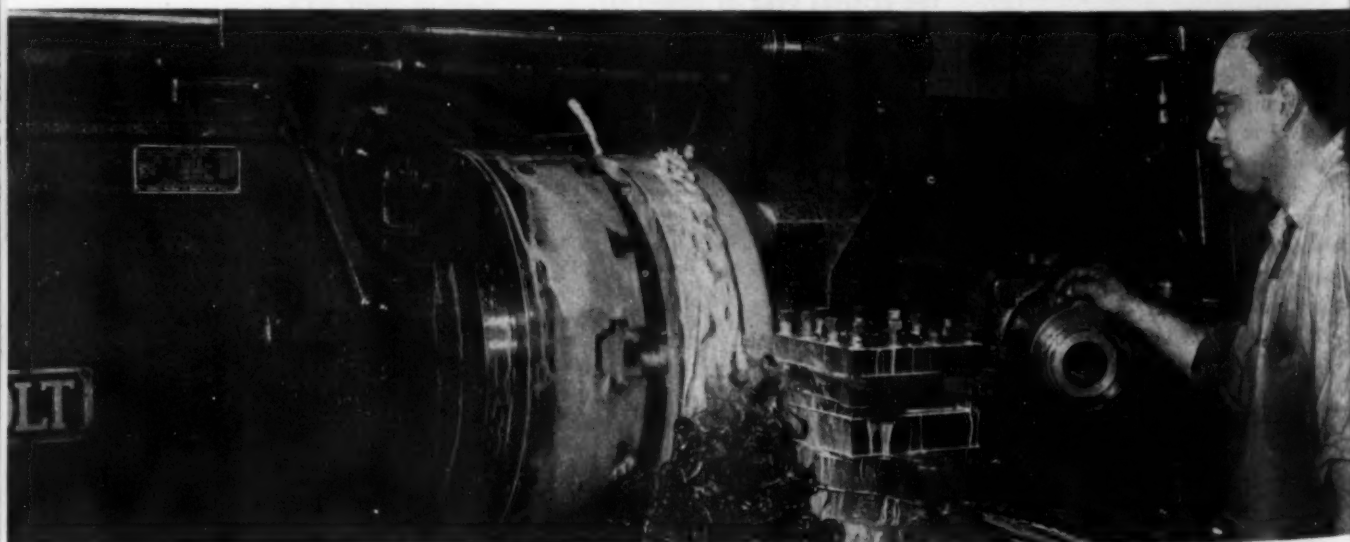
For complete information about S.E.C.O., write SUN OIL COMPANY, Philadelphia 3, Pa. Address Department IA-9.



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Metal: malleable iron • Operation: threading and chamfering 1½" 45° elbow • Cutting Speed: 75 sfm • Tools: high speed • Production: 306 pieces per hour • Cycle Time: 11¾ seconds • Cutting Oil: 1 part S.E.C.O. to 10 parts water



MACHINE: Brown & Sharpe No. 2 Universal Grinding Machine
Part: screw machine spindle sprocket • Metal: AISI-C1107 • Operation: grinding 90° included angle • Method: plunge-cut ground periphery of wheel • Grinding Oil: 1 part S.E.C.O. to 40 parts water



MACHINE: Gisholt turret lathe, model 4L • Part: 20" press mold shell, 22½" O.D., 6" depth, 20½" I.D. • Operation: turning and boring rough forgings • Materials: 40 to 50 carbon steel • Tools: Firthite carbide • Feed: .012 at 31 rpm • Cut: ½" to ¾" on O.D. and boring • Cutting Oil: 1 part S.E.C.O. to 10 parts water

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Machine Tool High Spots

Are Further Stretch-Outs Coming?

Steelman report that defense deliveries are reaching peak, increases machine tool builders' uncertainty . . . More information on military needs would help—By E. C. Beaudet.

Just prior to his retirement as acting defense mobilizer, John R. Steelman in a report to the President disclosed that delivery of military hard goods for the defense program had reached a peak of \$2 billion monthly starting in June. Deliveries are expected to hit a peak of \$2.7 billion in about 9 months.

With the defense program hitting such high levels machine tools builders look forward, but not optimistically, to a further stretch-out of government requirements. What they would like to find out is just what the various military services will need in the coming months.

Uncertainty—As yet no definite answer has been forthcoming. This creates a feeling of uncertainty about new orders and the firmness of orders already on the books.

With more information manufacturers would be in a better position to judge their future markets. Declining backlogs throughout the industry, loss of foreign markets and reduction in the amount of subcontracting let by some firms are presently causing some concern.

More concrete information on government needs would make it possible for National Production Authority to make future revisions of M-41 which would allow more orders to be placed by civilian customers, if the facts warranted them.

Suspended—As expected, recent requirements that defense contractors and subcontractors list ceiling prices as well as quoted prices in contract sales to various

government services has been suspended until Oct. 15. At that time the requirement may be discontinued permanently by Office of Price Stabilization.

This revision of General Overriding Reg. 2, effective July 26, threatened to play hob with accounting departments of machine tool builders. Some builders branded it as unworkable as soon as it came out.

Complex—The vast number of products, particularly parts, to be quoted on, computing of base periods, prices etc., would call for a costly, extremely burdensome job. It was particularly irritating in view of the fact that many machine tool builders are selling their products well below ceiling prices.

The amendment suspending the provision became effective Sept. 2. In the interim between then and Oct. 15 OPS will try to decide whether the requirement is workable or drop it altogether.



Await Freeze — Machine tool builders are anxiously awaiting an amendment to M-41 which would permit a freeze of non-rated orders at some definite period before their scheduled delivery. It is felt that such an amendment would go a long way to keeping the industry in a healthy condition.

As things stand now, any rated order can take precedence over a non-rated one any time up to the date of delivery. Thus no non-rated customer can be sure of getting a machine tool until it is shipped.

Help Sales — Such an amendment would tend to encourage more buying from civilian industries in that builders could then quote definite delivery dates and be sure of carrying them out.

It would also help revive the fallen foreign market as nonrated European and other consumers outside the U. S. could definitely go through with arrangements for important equipment.

Import of Tools—Swan E. Bergstrom, vice-president of the National Machine Tool Builders Assn. and the Cincinnati Milling Machine Co. gave some idea of the telling impact the machine tool industry has made on the national economy in the last century and a half. Speaking at the Symposium of Tools of the Centennial of Engineering in Chicago last week he stated that machine tools have enabled men to apply electricity, steam and metal to do the work which in the handicraft era was done by men with meager results.

He pointed out that in 1800 the power required to convert our natural resources into useful goods was supplied 16 pct by men, 80 pct by animals and 4 pct by steam engine and water wheels. By 1950 this power was contributed 92 pct by electric motors, steam and combustion engines and 4 pct each by men and animals.

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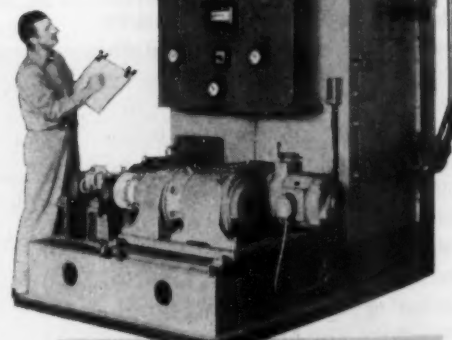
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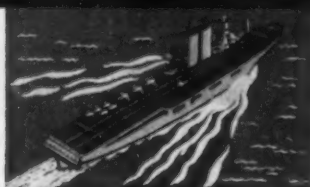
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Colombo Plan Truck, Bus Gift to India

Ford of Canada gets \$3,250,000 order for vehicles to be given to India as gift . . . Diesels to be made in England, not U. S. . . Which union controls oil workers—By F. Sanderson.

A \$3,250,000 order for trucks and buses has been placed with Ford Motor Co. of Canada Ltd., Windsor, by the Canadian Government. The contract covers 450 buses and 835 trucks powered with diesel engines which will be shipped to India under the Colombo Plan gift from this country.

Bombay State Transportation System will get the vehicles. Cash to make them will be drawn from the \$25 million Canadian Colombo plan contribution for the fiscal year 1951-52.

Engines from England—In London, F. Perkins Ltd. of Peterborough, England, reported it had received a \$1,250,000 contract from the Canadian Government to produce the 6-cylinder diesel engines for the vehicles.

Reasons the Canadian Government placed the diesel order in Britain were:

(1) No Canadian firm produced them; (2) Though the government could have obtained them in the United States, the price in Britain actually was lower; (3) The government wanted the order to go to Britain to help that country earn more dollars.

Senseless Strike—One of the strangest strikes in Canadian labor history is in its ninth week and at press time was still continuing. It involves no wage demand, no working terms. The only labor question at issue is whether the union is in command of the men.

The strike was launched July 24 by the Oil Workers Union against Canadian Copper Refiners Ltd., a subsidiary of Noranda Mines Ltd. at Montreal East. It closed down

the plant completely. The plant handled about half of Canada's copper, including that from Noranda, Hudson Bay, Quemont, Normetal, Waite Amulet and East Sullivan Mines. No loss of production has been suffered as the metal has been processed in Ontario and American refineries.

Double Protest—Oil Workers is a small union in Canada, having only one oil contract in Quebec. It obtained verbal certification from a provincial labor inspector, to represent the refinery men. A large group of employees, through an association which long had represented them, and the company, protested on the ground that the union had not proved its position.

They were denied permission to put in a case. The deputy minister of labor asserted that the company would have to come to terms with the union. The company took the matter of who should repre-

sent the employees to court. There it stands and is not likely to be heard before October.

When the union saw the company's hand could not be forced it pulled the men off work—or enough to force the others out.

Electronics Plant—Sylvania Electric (Canada) Ltd., has started preliminary work on the erection of a new \$1 million electronics plant at Drummondville, Que. It's scheduled for completion by the end of 1952.

How Much Steel?—Canadian production of primary iron and steel shapes in May 1952 was 434,160 net tons. Of this 156,065 tons were for producers' interchange. This compares with output of 420,805 tons in April and with 448,937 tons in May 1951. For May '52 output included 420,941 tons of carbon steel shapes and 13,219 tons of alloy steel shapes.

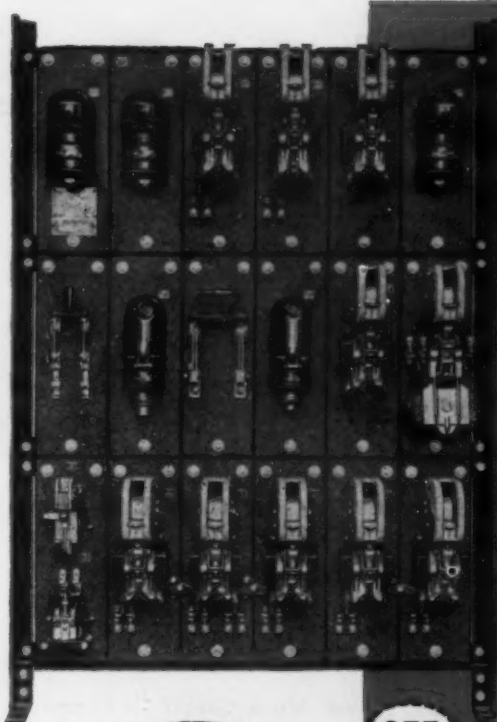
Primary iron and steel shapes shipped for sale in May amounted to 274,133 net tons against 268,979 tons in April.

Valves—Because of the importance of Western Canada oil development, Crane Ltd. will build a new plant at Calgary, Alta. This new plant is part of the company's nation-wide expansion program to increase manufacturing and sales facilities.

Construction of the 1-story, 50,000 sq.-ft. plant will start immediately with the expectation that it can be in production before next summer. Primarily designed to manufacture cast iron and brass valves and pipe fittings, the plant also will provide facilities for custom molding and machining and assembling of steel valves.

Set to Spend—General Motors Corp. will spend \$40 million on current and projected construction in Canada between now and the end of 1953, said C. E. Wilson, Detroit, president of General Motors on a visit to Toronto.





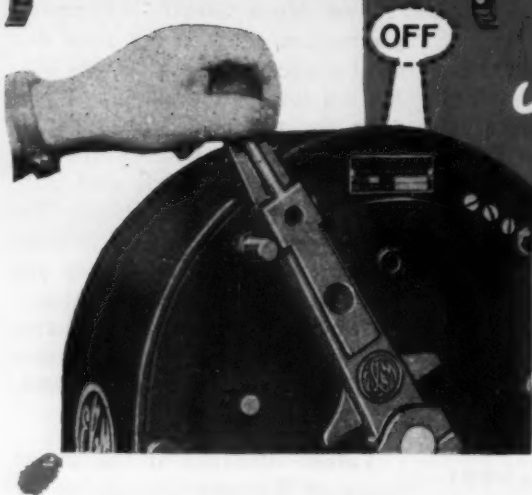
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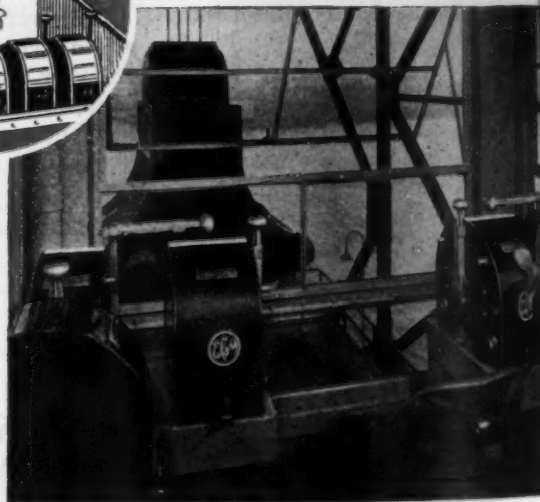
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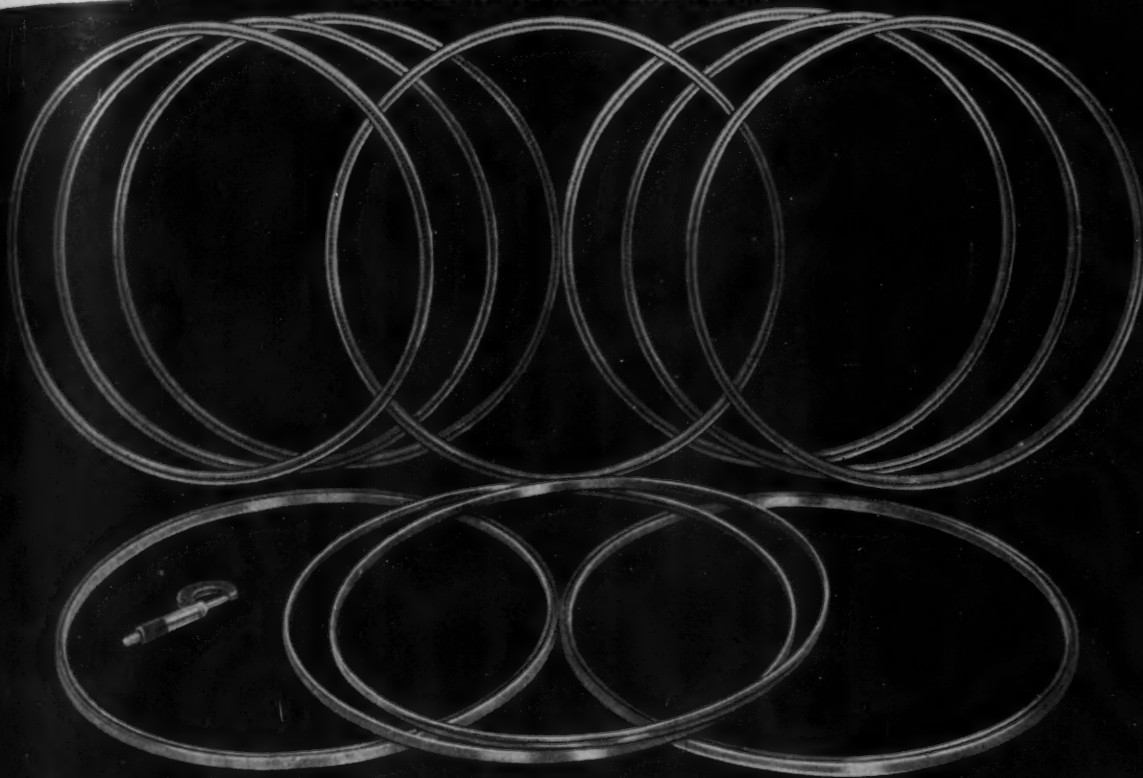




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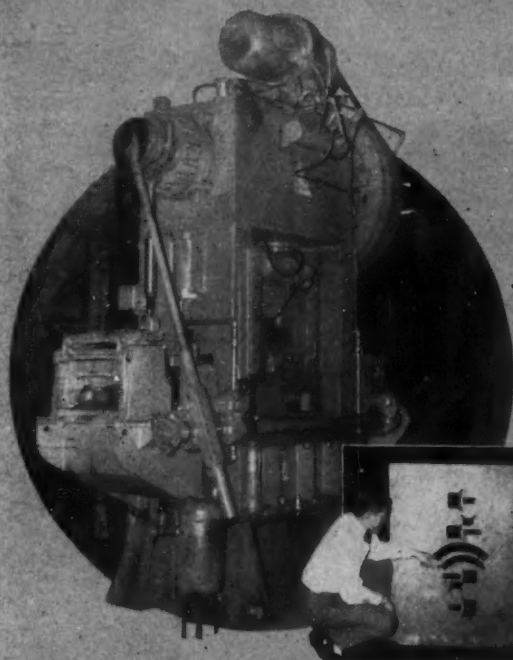
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Automatic lathe

Detailed information about the Sunstrand Model 4A automatic lathe is contained in an 8-p folder recently published. Spindle speeds and front carriage and rear slide cycles are given for a wide variety of jobs. Keyed photographs fully describe the essential components. Complete specifications for the spindle, front carriage, rear slide, tailstock, spindle drive motors and coolant pump are also included. Dimensions and shipping data are tabulated for easy reference. *Sunstrand Machine Tool Co.*

For free copy circle No. 12 on postcard, p. 111.

Thermal control

Comprehensive technical treatment has been given to the subject of recording and indicating circular case electric control thermometers in Catalog 6482, published by Minneapolis-Honeywell Co. These industrial thermometers are used for temperature control on drying ovens, cooking kettles, lumber kilns and plating tanks. Information in the booklet includes available switching action, chart and scale ranges, dimensions and bulb and tubing variations. *Minneapolis-Honeywell Regulator Co.*

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Every braiding strand in Lattice-Braid packing passes diagonally through the packing at about a 45° angle to form a unified structure. The Garlock Packing Co. tells in their new booklet how these manufacturing characteristics work to advantage under various conditions. *Garlock Packing Co.*

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Filters

Two revised bulletins pertaining to Liqui-Jector equipment for the removal of water, water-oil emulsions and dirt from compressed air and gas lines have just been released. The equipment operates without moving parts using specially treated ceramic filter candles. *Selas Corp of America.*

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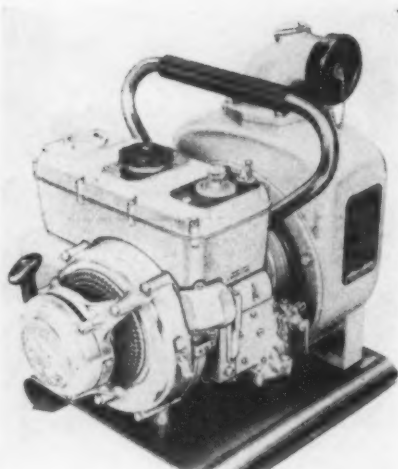


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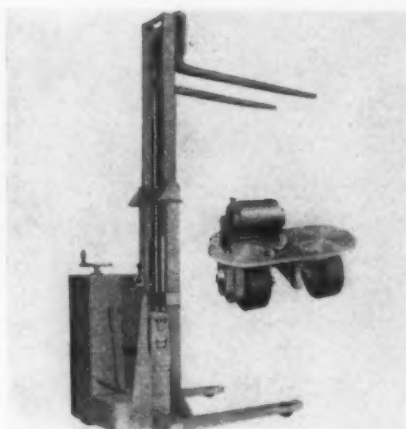


Lightweight pump delivers 15,000 gph

A gasoline-powered, self-priming, centrifugal pump weighs only 57 lb but can deliver 15,000 gph of water at pressures up to 100 lb. Weight-engineered for portable duty in fire-fighting work, it is equally effective in delivering fog, spray, stream or foam. A cut of about 50 pct off the weight of a conventional 15,000 gph pump was made possible primarily through the use of high-pressure diecastings. The engine, a 2-cycle type, develops 7 hp at 4,500 rpm. Its starter is an automatic-rewind

cable type. Lubrication is obtained entirely from the fuel mixture requiring no other greasing or oiling. A non-clogging impeller is mounted on the engine shaft eliminating bearings in the pump. Engine speed is controlled by a centrifugal governor. Known as the model 7 FP, this pump is intended as a truck-pumper accessory or as a standby fire-fighting unit in isolated or inadequately protected locations. *McCulloch Motors Corp.*

For more data circle No. 16 on postcard, p. 117.



Telescopic lift makes 11-ft stacks

With this new materials handling unit, called a Transveyor, goods can be tiered 11 ft high in aisles only 6 ft wide. The basic model easily handles 2,500-lb, 48-in. long loads in close quarters. Two mast heights, 68 and 83 in., provide telescopic lifts of 102½ and 132½ in. respectively. It is said to be the only battery-powered industrial truck with four wheels having 3-point suspension. This equalizes the load of both front wheels re-

gardless of floor conditions. Controlled plugging, good visibility for the driver, cold drawn alloy steel uprights and dead-man control are other features. Overall length is 29⅞ in. plus load length. A foot pedal releases the brake and controls first speed. A push-button on the hand grip governs other speeds. It lifts a 2,500-lb pallet load 20 fpm and has a speed of 4 mph. *Automatic Transportation Co.*

For more data circle No. 17 on postcard, p. 117.



Versatile machine speeds metal cutting

Production has been started on a 1 hp radial arm machine for use in the light metals industries. The De Walt model GW metal-cutting machine makes straight, miter, bevel or compound-miter cuts in a matter of seconds. There is no lengthy delay in changing from one cut to another. It can be used with metal-cutting saw blades on aluminum and other nonferrous stock or with abrasive wheels on small-gage steel

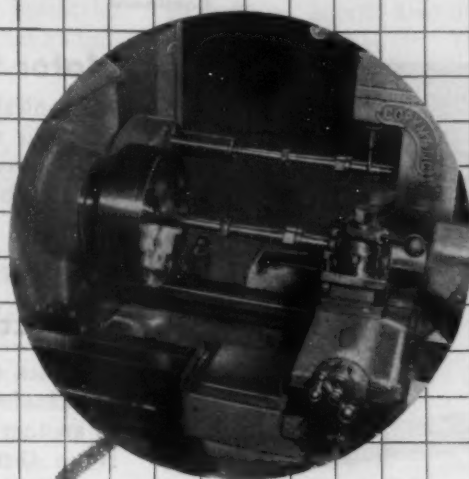
and other ferrous metals. It is particularly useful for storm windows and screens. A feature is the simple method of removing the extra metal cutter top from the standard top and replacing the metal-cutting blade with a wood-cutting blade when converting to woodworking operations. *De Walt, Inc.*

For more data circle No. 18 on postcard, p. 117.

Turn Page

(Oil equipment manufacturer reports)

**production
increased
at
least
60%**



**with
Lodge & Shipley
copymatic**

**COPYMATIC form turning
various oil well equipment items
at Otis Engineering Corp.,
manufacturing affiliate
of well-known
Otis Pressure Control, Inc.,
Dallas, Texas.**

In the production of sub-surface controls which must be placed and operate in oil well casings far underground, the precision and speed of the Lodge & Shipley COPYMATIC Lathe are valuable assets. This manufacturer says, "tolerances can be held closer . . . the COPYMATIC can be used as tracer type or conventional lathe . . . is very easy to operate."

On a typical job, 303 Stainless is turned for O.D. and taper at 549 RPM and .0067" feed, using Kennametal K3H tools. On this and other jobs involving form boring and threading, the user "has been very successful in decreasing production costs over the use of conventional lathes."

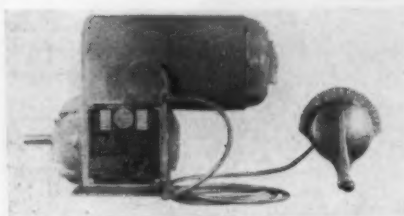
In any size shop . . . on a multitude of operations . . . the speed and versatility of the COPYMATIC, coupled with the accuracy of the Lodge & Shipley Model X Lathe, turns out more work at lower cost. For additional case histories, complete details, write:

**THE Lodge & Shipley
COMPANY**

**3061 Colerain Avenue
CINCINNATI 25, OHIO**

New Equipment

Continued

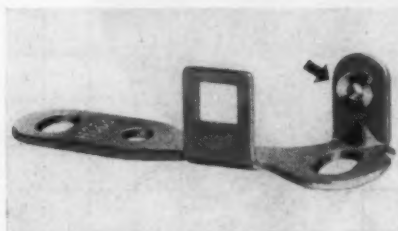


Motor features remote variable control

Mechanical remote control is featured in a lightweight fractional horsepower Varidrive motor Type 5 VA. The remote control includes a control handwheel with indicator dial and a 5-ft flexible cable.

Varidrive is available in $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$ and $\frac{3}{4}$ hp and in a speed ratio range up to 10 to 1 over a range of 4 to 10,000 rpm. *U. S. Electrical Motors, Inc.*

For more data circle No. 19 on postcard, p. 111.

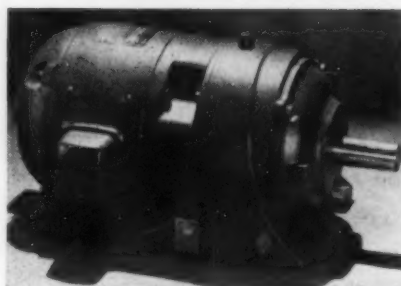


New contacts lessen metal transfer

Tungsten contacts tend to migrate or transfer metal from one point to another when an arc occurs between them. By ventilating one contact, the migration or transfer effect is greatly diminished. Ven-

tilated contacts have 3 times the life of conventional contacts. They have widespread use in automotive and truck ignition systems. *Fansteel Metallurgical Corp.*

For more data circle No. 20 on postcard, p. 111.



Gear motor simplifies maintenance

Newly designed to simplify maintenance, a gear motor has been built in 3 pieces to permit quick and easy removal of a defective stator without disturbing gear components or gear connections. Its unique design includes a GE Tri-Clad motor; a compact planetary

gear; and a mechanical adapter. The gear is available in speed ratings of 780 to 13.5 rpm. The new motor is available in ratings of 1 to 75 hp for standard uses and up to 200 hp for special applications. *General Electric Co.*

For more data circle No. 21 on postcard, p. 111.

FROM THE SMALLEST

There's a SPO for every job!

From the smallest to the world's largest jolt-squeeze-stripper, SPO has a model to meet every foundry production need. SPO molding machines range from small, portable, manually operated units to fully automatic, push-button giants.

Regardless of its size, each SPO molding machine is built for safe, dependable operation and maximum accuracy. Many feature the patented "inverted jolt" mechanism which assures extremely

long service life with minimum maintenance. All incorporate SPO air vibrators which are known for their sturdy construction and operating efficiency.

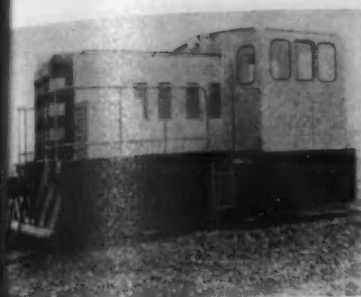
Whatever your production schedule, SPO builds a molding machine to meet your requirements. To obtain the finest foundry equipment available today, SPECIFY SPO . . . the world's largest supplier of molding machines.

Write today for Bulletin No. 2000
for complete data.



INCORPORATED

813-51

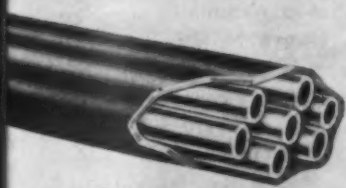


New diesel switcher designed for plants

Designed specifically for industrial plant switching service, this 35-ton, 190-hp unit is powered by a 6-cylinder, 4-cycle super-charged diesel engine rated at 225 hp at 1800 rpm. It has a tractive effort of 17,500 lb at 25 pct adhesion and 21,000 lb at 30 pct. Built for track gages from

30 to 66 in., overall length 17½ ft, and wheelbase 6½ ft. Transmission includes a Twin-Disc torque converter and clutch with 2-speed transmission. Speeds are 10.6 and 28 mph. *Baldwin-Lima-Hamilton Corp.*

For more data circle No. 22 on postcard, p. 117.

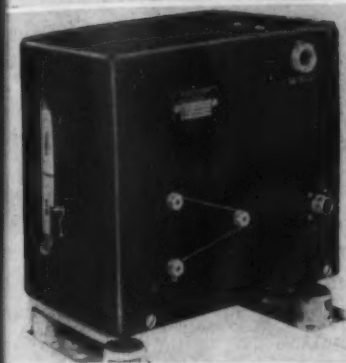


Harness protects tubing from corrosion

Dekoron Impervapak Metl-Cor, a new corrosion-proof instrument tubing harness is impervious to attack from moisture or corrosive industrial atmospheres. It consists of a bundle of tubes over which is ex-

truded a high molecular weight polyethylene plastic. It is available in lengths up to 50 ft with 4, 7 or 10 metal tubes of ¼ or ⅜ in. OD. *Samuel Moore & Co.*

For more data circle No. 23 on postcard, p. 117.



Pressurizing kit prevents cavitation

The Lear-Romec pressurizing kit is used to prevent cavitation in aircraft engine-driven hydraulic pumps by compressing air in the oil tank. It operates efficiently at high altitudes with capacity of 100 cu in. per min at 35,000 ft. Intermittent operation is fully automatic. Pipe connections on all components are straight threaded.

Incorporating dry-air components, the unit has a 30-cu in. silica gel dehydrator and a type Q-1 air compressor. Pressure switch is set to start pumping at 7 to 8 psi gage and to stop pumping at 9.75 psi gage maximum. Total weight is 9½ lb. *R. S. Atkinson, Lear, Inc.*

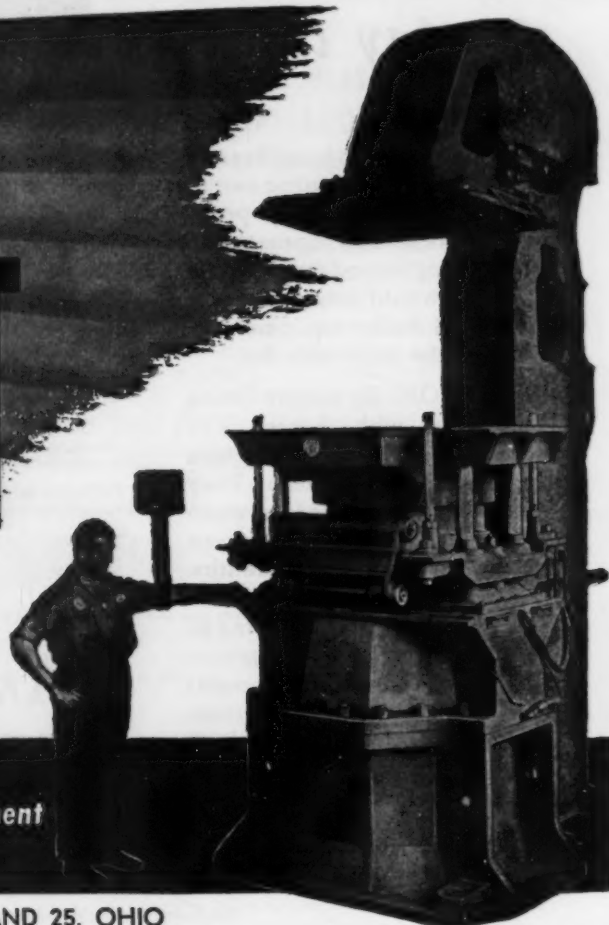
For more data circle No. 24 on postcard, p. 117.

Turn Page

TO THE

BIGGEST

Molding Machine



Manufacturers of MILWAUKEE type foundry equipment

6461 GRAND DIVISION AVENUE • CLEVELAND 25, OHIO



Vapor from Paper Stops Rust



Now parts in-process are
*stored clean
to stay clean*



PROBLEM: High humidity and acid fumes were causing rust to form while these shiny precision parts for sewing machines were being turned out. Protective dips would involve a lot of time and bulky equipment to "clean" the parts next day.

SOLUTION: By simply lining tote pans with Angier VPI wrap, the parts are *stored clean* ... and they *stay clean*. They are bright and rust-free when removed from the pans — even if they are stored for months. All because VPI vapor permeates the area inside the pans to make moisture and factory atmosphere harmless to metal surfaces. No oil or grease coating is necessary. So "cleaning" time is saved.

WHAT IS YOUR PROBLEM
... storage of parts in-process,
storage for inventory ... or

shipping metal products? To get "VPI Facts", check below the products stored or shipped by you. Send today to the most experienced name in vapor rust preventives — Angier Corporation, Framingham 10, Mass.

- | | |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <input type="checkbox"/> Machinery—Industrial, Metal Working, Farm, Office, Construction. | <input type="checkbox"/> Steel in process of fabrication. |
| <input type="checkbox"/> Electrical Machinery, Appliances, Products. | <input type="checkbox"/> Instruments and clocks. |
| <input type="checkbox"/> Fabricated Products—Cutlery, Hardware, etc. | <input type="checkbox"/> Ordnance Equipment. |
| <input type="checkbox"/> Transportation Equipment—Aircraft, Auto, Naval, Railroad, etc. | <input type="checkbox"/> Others: |

Angier VPI® Wrap

The PROVEN
Vapor Rust Preventive

Distributors of Angier Industrial Papers in All Principal Cities

—New Equipment—

Continued

Lightweight pump

Spraying from the original container is possible with a new spray pump and control unit. Transfer of lacquers, paints, enamels or special finishes is not necessary because the unit fits any standard drum. Its primary advantage is that it eliminates surge caused by pressure buildup when the spray gun is turned off. The spray gun is the only control, shutting off the pump and spray simultaneously. When returned to operation, no spurts or globs of material damage the finished job. The unit can supply and control 3 spray guns operating at one time. *Wilkinson Equipment & Supply Corp.*

For more data circle No. 25 on postcard, p. 117.

Magnetic tagline

Development of a new type magnetic tagline for use on clamshell and electro-magnet service has been announced. It consists of a drum mounted on the hoisting drum shaft which has a series of permanent magnets. Their magnetic attraction to the tagline drum flange exerts a constant pull on the tagline rope. It requires no adjustment or maintenance, and has no clutches, springs or other parts. *Osgood Co.*

For more data circle No. 26 on postcard, p. 117.

Adjustable screwdriver

The new "Click-It" screwdriver made in four models is equal to 32 lengths and types in regular, recess, clutch-head, and Phillips type. Its blades are reversible for the type head desired and adjustable to any length from 3½ to 14¾ in. The blades are made of finest precision-machined steel and the handle of plastic material having high impact strength. *E. L. Dye Co.*

For more data circle No. 27 on postcard, p. 117.



Turn Page

HERE'S YOUR PROOF OF . . . DRAVO *Counterflo* HEATER VERSATILITY!




DRAVO "Counterflo" HEATER CASE STUDY REPORT

FOR: FEDERAL ROGUE CORPORATION
 Location: DETROIT, MICHIGAN
 Product: SMOKE REARMS
 Fuel: 5-COMBINATION GAS AND HEAVY OIL
 Output: 2,000,000 Btu EACH
 Number: 10

These Counterflo Heaters are used at one of our study

for TEMPERING MAKE-UP AIR



DRAVO "Counterflo" HEATER CASE STUDY REPORT

FOR: JAMES A. LAURENCE STEEL CORPORATION
 Location: ALTOONA WORKS, ALTOONA, PENNSYLVANIA
 Product: STEEL PIPE
 Fuel: BLAST FURNACE COKE OVEN GAS
 Output: 100,000 Btu EACH
 Number: 4

These Counterflo Heaters are used at one of our study

for DE-FOGGING

get these
FREE case studies now!

Detailed information and photographs show how heaters can be adapted for tempering make-up air . . . or how de-fogging of a plant may be accomplished using Dravo Heaters. These case studies give you proof of Dravo Heater versatility, and they're yours for the asking.

DRAVO HEATERS OFFER YOU:

- LOW INITIAL COST**—Users report 30% to 60% savings over "wet-type" systems.
- EASY INSTALLATION**—Need only fuel, exhaust and electrical connections . . . no ductwork.
- LOW OPERATING COST**—Direct-fired . . . burn gas or oil . . . readily converted . . . minimum efficiency 80%.
- AUTOMATIC OPERATION**—On-off or modulating controls . . . no constant attention needed.
- LONG SERVICE LIFE, LOW MAINTENANCE**—Stainless steel combustion chamber eliminates refractory lining.
- SAFETY**—Approved by American Gas Association, listed by Underwriters' Laboratories, Inc.; Dravo standardized safety control circuit accepted by Factory Mutual Engineering Division.
- MOBILITY**—Can be moved to any location.
- FLEXIBILITY**—When floor space is limited, can be wall-hung or suspended from trusses in any position.

DRAVO HEATERS SOLVE HEATING PROBLEMS IN THESE INSTALLATIONS, TOO:

- **PROCESS DRYING AND HEAT CURING**—where moisture content must be controlled or removed from air, and temperature regulated to meet production needs.
- **HEATING AND VENTILATING STORES, SCHOOLS, AUDITORIUMS, AND LARGE BUILDING AREAS**—where quick, automatically controlled, low-cost heating is desired.
- **TEMPORARY HEATING**—where comfort heat is necessary during building construction or to keep ground temperature above freezing in winter.

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| <input type="checkbox"/> Space heating large buildings | <input type="checkbox"/> Stores, schools and auditoriums |
| <input type="checkbox"/> Tempering make-up air | <input type="checkbox"/> Please have a representative call. |

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City _____ Zone _____ State _____

When writing ask for Bulletin DE-523

DRAVO

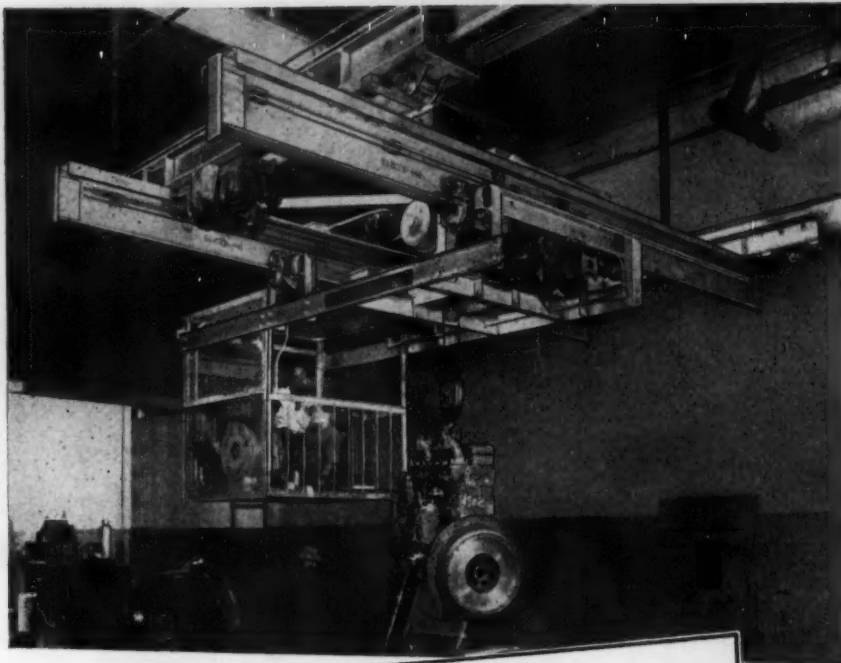
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September 11, 1952



here's the crane for . . .

CONSTANT SERVICE at HIGH SPEED

If your handling operations must be "on the go—all the time—and fast" then investigate this American MonoRail Crane. With constant service at high speed, it offers the advantages of rugged construction, low-cost operation and quick installation.

The big reason is articulated trolleys. Each trolley wheel carries its share of the load in perfect alignment with the craneway tracks. All possible friction is eliminated. The result is perfectly articulated trolley travel. Articulated trolleys permit operating speeds of 500 feet per minute under constant service.

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THE AMERICAN MONORAIL COMPANY

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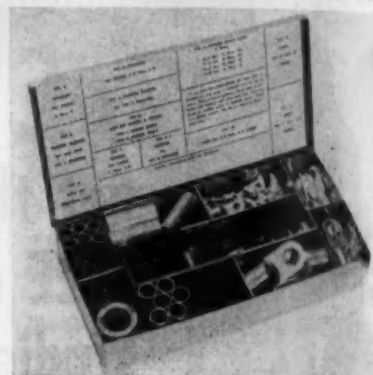
New Equipment

Continued

Cable repair kit

A cable repair kit to enable on-the-job repairs of electric welding and power cables has been introduced by Gas Arc Supply. The Fast Fix kit contains all necessary tools and parts for putting lugs on No. 14 through No. 6 power cable and for splicing or putting lugs on No. 6 through No. 4/0 welding cable. Materials for insulating and properly finishing the work are also included. It is packaged in a steel carrying case with complete instructions for use. Replacement parts are available. *Gas Arc Supply.*

For more data circle No. 28 on postcard, p. 117.



Industrial fan

A rugged industrial fan has been built for use with three different wheels. It is made in 11 sizes with capacities ranging from 670 to 44,000 cfm and pressures up to 16 in. water gage. An air handling wheel has backwardly-inclined blades and is particularly suitable for exhausting smoke, fumes and light dusts. A straight-bladed wheel is used for conveying sawdust, granular materials and chips. A long shavings wheel is for long, stringy fibers. *Westinghouse Electric Corp.*

For more data circle No. 29 on postcard, p. 117.

Floating sweeper

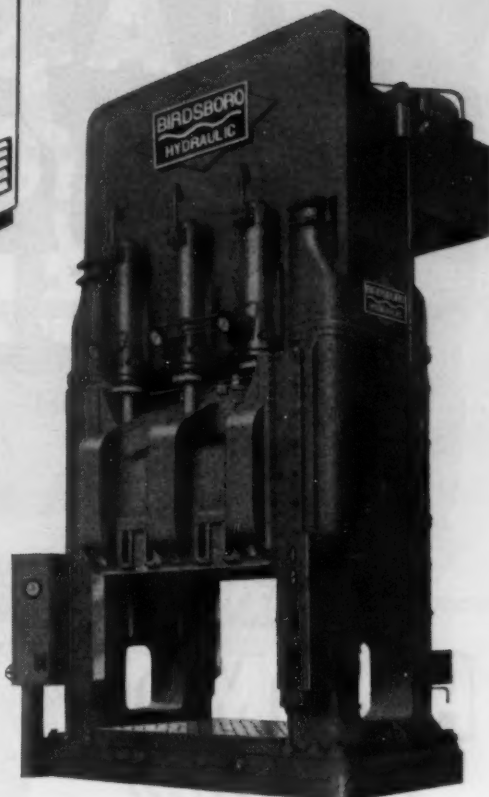
A new device, known as the Automatic Terrain Compensator, has just been announced by the Lull Mfg. Co. This spring-loaded float automatically compensates for uneven ground and maintains constant broom-ground contact pressure at all times. More uniform and faster sweeping is claimed for this device. *Lull Manufacturing Co.*

For more data circle No. 30 on postcard, p. 117.

IN WATER COOLERS
standard models do the job



IN HYDRAULIC PRESSES
it takes a different kind of engineering



To give you the results you want from Hydraulic Presses . . . steady, high output and a new freedom from maintenance headaches . . . it takes a different kind of engineering. It takes engineering that keeps your requirements in mind from the very start of press design . . . through construction of components and assemblies . . . to skilled installation in your plant.

BIRDSBORO ENGINEERING SERVICE

If you feel (like many others) that this kind of engineering service can help to remedy production and profit ailments in your plant, we'd like to talk to you. There's no obligation. Birdsboro Engineering Service starts when and where you want it. First step is to contact Birdsboro's Engineering Department.

BIRDSBORO STEEL FOUNDRY & MACHINE CO.

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Offering Complete Engineering
and Construction Service on:

Steel Mill Machinery • Crushing Machinery • Rolls
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SLASH REJECTS LOSSES!

WITH
ALSiMAG[®]
Ceramic
STRAINER CORES

A rejected casting is a dead loss in time, labor, and materials. ALSiMag strainer cores reduce rejects, produce clean, smooth, even castings. Many standard core sizes in stock; special designs produced economically.

ALSiMAG STRAINER CORES: Resist heat shock better. Withstand normal pouring temperatures • Flat and uniform. Completely free of gas • Are tough and fast to handle.

FREE SAMPLES of sizes in stock sent on request. Samples hand made to your specifications at moderate cost. Try them. See for yourself.

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FACILITIES PERMIT

NEW LOWER PRICES
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DESCRIPTIVE BULLETIN NO. 522 AND PRICES ON REQUEST

AMERICAN LAVA CORPORATION

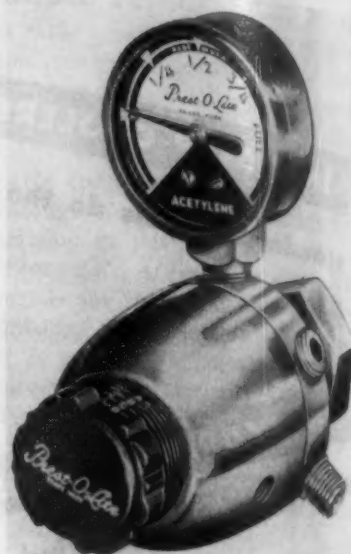
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51ST YEAR OF CERAMIC LEADERSHIP

OFFICES: Philadelphia • St. Louis • Cambridge, Massachusetts • Chicago
Los Angeles • Newark, N. J. • Dallas

New Equipment

Continued



Acetylene regulator

A new Prest-O-Lite acetylene regulator, with ample capacity for most efficient use of any air-acetylene torch or appliance, has been developed. This R-411 regulator is designed for small tank appliances such as paint burning and soldering outfits used by painters, plumbers and refrigerator repairmen. Pressures up to 13 psi can be delivered through this regulator. The pressure gage shows tank contents at a glance on a dial calibrated at $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and full. Linde Air Products Co.

For more data circle No. 31 on postcard, p. 117.

Massive grinder

Completion of a massive 12-ton hydraulic fluid motor driven grinder has just been announced by Samuel C. Rogers & Co. A grinder of this type is particularly adaptable for flat face, bevel and edge grinding of shear blades and other heavy-duty knives. Its work table measures 184 in. A magnetic chuck cuts loading and unloading time. Even though the work table weighs as much as 4 tons, the fluid drive moves it past the grinding head at speeds up to 100 fpm, gaining this speed within a foot of starting from a dead stop. Despite the speed, the machine can grind to within a 0.0015-in. tolerance. Samuel C. Rogers & Co.

For more data circle No. 32 on postcard, p. 117.

Welder-charger

A welder and charger are combined in an all-purpose, heavy-duty portable welder designed for use by repair shops, maintenance men and farmers. It has these features: output range, 15 to 175 amp; rated output, 140 amp; arc voltage, 25 v; open-circuit voltage, 65 v; power factor correction, 75 pct; duty cycle at rated amperage load, 50 pct; duty cycle above rated amperage load, 20 pct; draws 36 amp at 220 v; kva at rated output, 7.9; battery charging rate, 6 amp dc. It can handle rods from 1/16 to 3/16 in. and meets NEMA standards and FEA specifications. Also available without a battery charging circuit. *Mid-States Welding Mfg. Co.*

For more data circle No. 33 on postcard, p. 117.

CO₂ extinguisher

A new portable 12-lb CO₂ fire extinguisher measures only 11 in. wide and 24 in. high but has 20 pct greater fire fighting capacity. The lightweight unit features thumb-trigger release with no valves to turn or regulate. The 9-oz Flex-rite nozzle assures finger-tip aim. It contains 12 lb of non-toxic, non-damaging CO₂ and is especially adapted for flammable liquid and electrical fires. In tests, a 2-gal, 16-ft gasoline fire was stopped in 8 sec. *Randolph Laboratories, Inc.*

For more data circle No. 34 on postcard, p. 117.



Turn Page

the A-B-C of M-S-T

A ALWAYS
MAKES
POSSIBLE
B BETTER
PRODUCTS
C AT LOWER
COST

Michigan Electric Resistance WELDED STEEL TUBING

A
Quality
Product

Muffler Inlet Pipe

ROUND

3/8" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

1/2" to 2" 20 gauge, 1" to 2 3/4",
14, 16, 18 gauge

Carbon 1010 to 1025

Michigan Tubing

has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

This is an excellent example of Michigan workmanship in the performance of several intricate fabricating operations to most exacting tolerances.

The pipe manifold end is expanded to 2.225" I. D., a flange superimposed, and a flanged ferrule press-fitted for immediate assembly to exhaust manifold. Two bending operations with minimum reductions permit full flow of gas to hold back-pressure to a minimum. Muffler end diameter of tube is increased by expanding and a bead superimposed to form a "gas-tight" joint.

Michigan engineering and fabrication know-how make for accuracy and economy in the manufacture of this and many other tubular products. Why not consult Michigan about your fabrication problem.



Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

Michigan

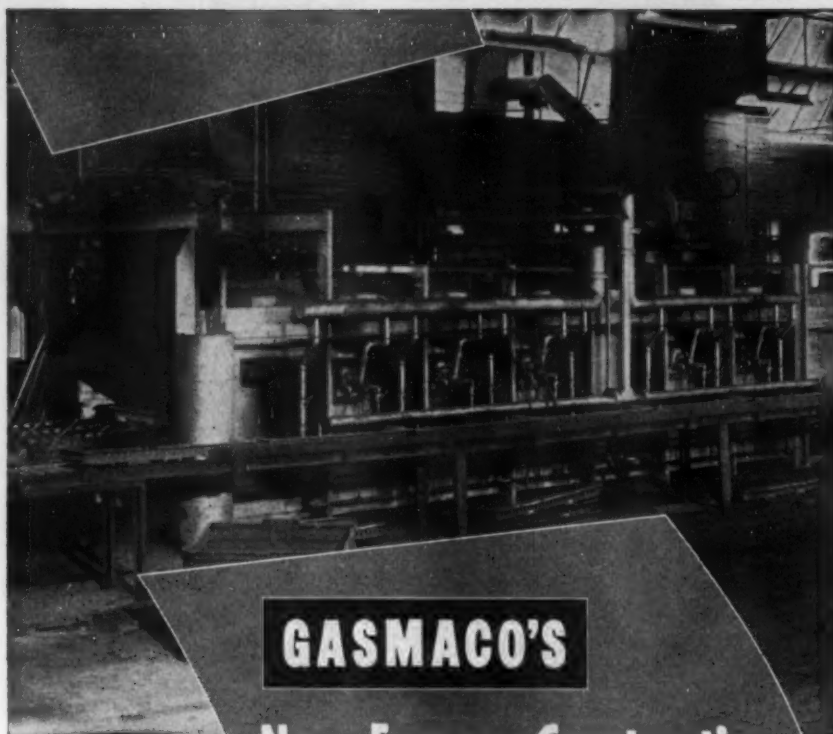
RESISTANCE WELDED STEEL TUBING
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GASMACO'S

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**ELIMINATES USE OF
CRITICAL MATERIALS**

Desirable savings in nickel and other critical materials can be accomplished through new methods in design and construction of industrial furnaces by The Gas Machinery Company.

Specifications for forging and heat treating can be met by employment of a rotary furnace, the construction of which requires only refractory and moderate quantities of carbon steel. Rotary furnaces require less investment for the same duty, and results are superior.

Other Gasmaco accomplishments include the use of silicon carbide in roller hearth furnaces, replacing alloy steel. For practically all applications where alloy steel tubes and rollers were formerly used, silicon carbide can be substituted, with greater benefit.

Our furnace engineers will be glad to point out the many advantages of Gasmaco developments and industrial heat applications which may fit your requirements.

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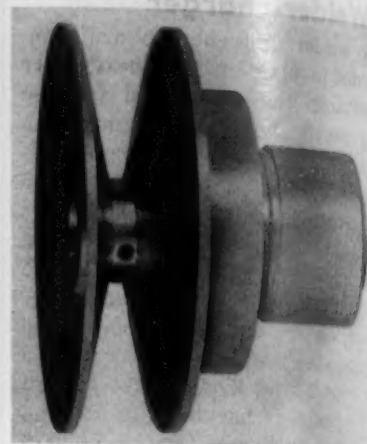
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New Equipment

Continued



Variable speed pulley

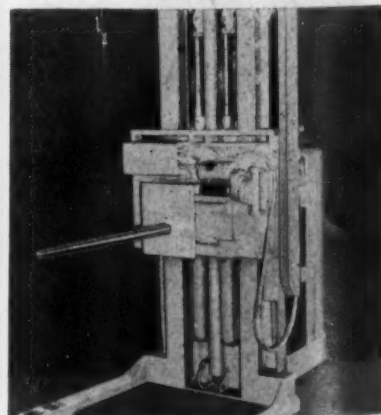
Var "A" Cone, a variable speed pulley incorporates a telescopic movable disc to reduce wear and vibration. It is used primarily for light horsepower equipment such as lathes, saws, drill presses, blowers and packaging machinery. Speed changes can be made within a 2% to 1 ratio while equipment is running. Bushings are of the oil-impregnated type. Unit rating is up to 3/4 hp at 1750 rpm. *Gerbing Manufacturing Co.*

For more data circle No. 35 on postcard, p. 117.

Side-shifting ram

Originally used in the textile industry for handling bolts of cloth, this newly designed side-shifting ram can now be used for handling rugs, coils of steel or other materials with a center opening. The ram has a 6-in. lateral movement, three inches to either side, to permit perfect alignment. It has a maximum elevation of 130 in. and may be used in aisles only 6-ft wide. *Raymond Corp.*

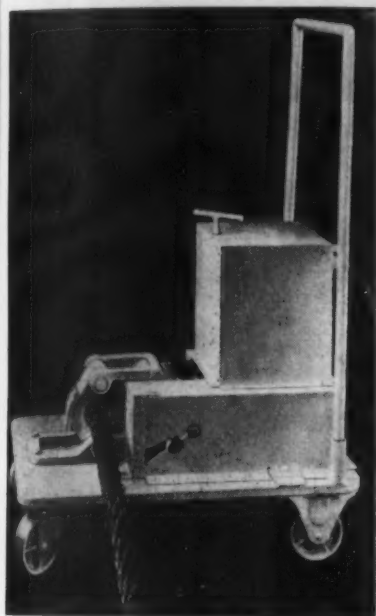
For more data circle No. 36 on postcard, p. 117.



Electric cable cutter

An electric motor-driven cable cutter, called Hydrashear, will cut up to 1 3/4 in. wire rope in 20 sec. It is powered with a 1/2 hp, 110-220 v, single phase motor-driven hydraulic pump which develops 10,000 psi. It can be plugged into any electric circuit. No special wiring is required. To operate, simply put rope in place, close switch and the shear will cut through the rope. When the cut is completed, the motor automatically turns off. The unit is about 24 in. long, 15 in. wide and weighs 135 lb. *Pell Cable Cutter Co.*

For more data circle No. 37 on postcard, p. 117.



Casting conditioner

Fewer rejects, brighter plating and no blackening during anodic cleaning are the prime advantages of a new electrolytic conditioner for zinc base diecastings in preparation for plating. Known as Composition No. 95, it removes surface films, disturbed metal and last traces of soil that cause peeling and blistering. It also avoids hydrogen formations that raise blisters when castings are heated after electroplating. Films that impair brightness of subsequent electroplates are removed. The conditioner rinses so freely that no residue films appear even with dry-down times as long as one minute. *Oakite Products, Inc.*

For more data circle No. 38 on postcard, p. 117.

JOHNSON UNIVERSAL BRONZE

AS NEAR AS
YOUR
PHONE



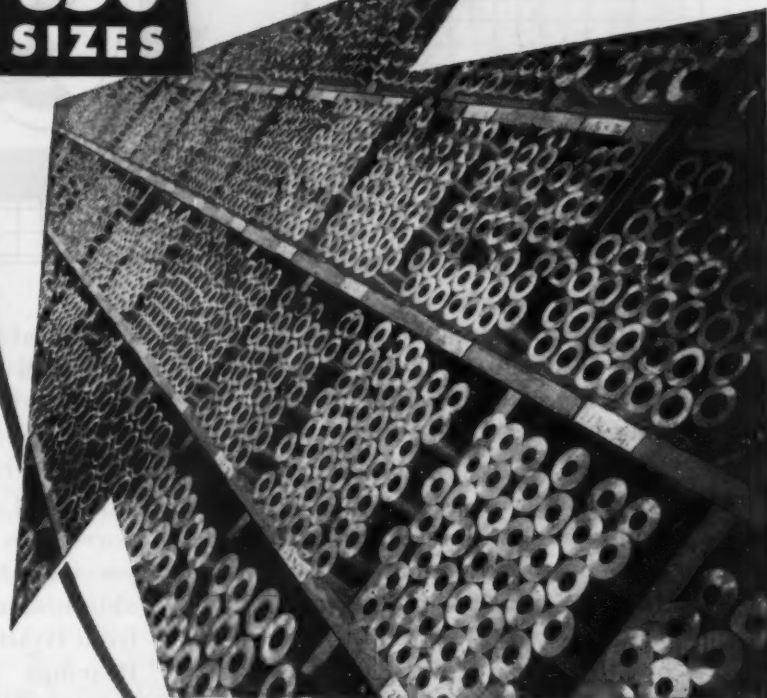
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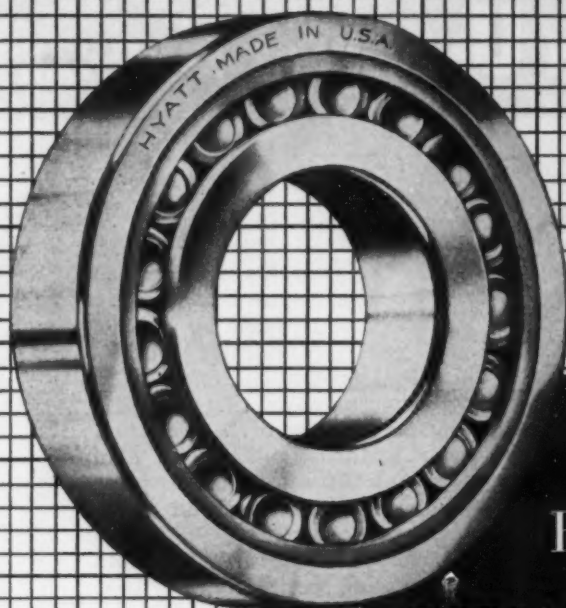
Johnson Universal Bronze is cast from highest quality bearing bronze, an alloy that cuts easily, yet is thoroughly serviceable. Cored bars are made with inside diameters from 1/2" to 7 3/4", outside diameters from 1" to 10". Solid bars from 5/8" to 8" diameters. Call your Johnson Bearing distributor.

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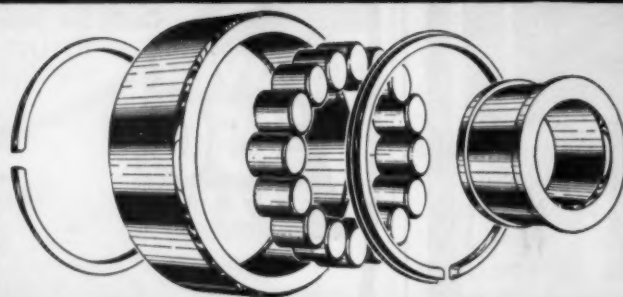
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For Maximum
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HYATT HY-LOADS



THERE are ten major types of Hyatt Hy-Loads—the high capacity cylindrical roller bearings for radial or light or intermittent thrust loads.

Four of the ten Hy-Loads have separable inner races, two have separable outer races and four are non-separable. Made in two diameter series, wide and narrow widths, to standard boundary dimensions, they permit wide flexibility in machine design and assembly procedures.

Typical of the Hyatt-Hy-Load line, the U-TM bearing, one of the non-separable types is illustrated and shows its full complement of rollers for maximum bearing load-carrying capacity.

And all other types, too, are just as correct in their design and equally precision-built for the kind of dependable bearing performance you expect from Hyatt equipped machines. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

The **Iron Age**

SALUTES

Robert C. Swanton

His eternal willingness to do more than is asked is only one of the reasons for his success.



THIS year Bob Swanton's fellow purchasing agents paid him their highest honor by awarding him the J. Shipman Gold Medal. It was a wise choice and a justly deserved tribute because he has been rendering stellar service to this and other groups for a long time.

His eternal willingness to do more than is asked of him is only one of many reasons he is outstanding in a group of competent and successful men. He's a fine organizer, a superbly gifted speaker, a highly skilled but practical business analyst.

Space permits mention of only a few of his achievements. His No. 1 job is director of purchases at Winchester Repeating Arms Co. division of Olin Industries, Inc. He's also assistant secretary and assistant treasurer of Olin.

He's a past president of National Assn. of Purchasing Agents. He heads that group's Business Survey Committee, the group that issues monthly statements on business conditions as seen through the eyes of 200 key PA's.

Bob Swanton helped organize the National Assn. of Cost Accountants, directed it in its first 2 years. He helped the city of New Haven set up purchasing standards and select a purchasing agent. He now acts as purchasing officer of the New Haven American Red Cross Disaster Committee. He was on the advisory committee to the U. S. Treasury Dept. on stockpiling of strategic materials. Today he is a member of the Committee on Economic Policy, U. S. Chamber of Commerce and a director of the New Haven C. of C.

With all these responsibilities he's still a familiar sight at the rummy table following noonday luncheon at the Winchester Club.

STANDS UP UNDER THE SEVEREST FORMING

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**HARD DRAWN
MB SPRING**

WIRE



...Selected and Preferred for Zig-Zag Spring Wire in Automobile Seat and Back Cushions

Hard Drawn MB Spring Wire produced by Wickwire is used extensively as zig-zag spring wire in the construction of the latest ribbon type of spring units for automobile seat cushions.

Such wire demands the maximum degree of strength, ductility and uniformity in order to withstand the extremely severe deformation necessary in the fabrication of these springs. Painstaking care must be exercised in the selection of the right steel and in subsequent processing operations.

Wickwire Hard Drawn MB Spring Wire measures up in every way to these exacting demands because every step of its production, starting in our own open hearth furnaces, is under constant control, subject to uncompromising testing and inspection.

Widespread use of Wickwire Hard Drawn MB Spring Wire in this severe service is your assurance that when you select this high-carbon wire for your particular application, you can always count on getting the finest.

THE COLORADO FUEL AND IRON CORPORATION • Denver, Colorado
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WICKWIRE WIRE



PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

1258

The Iron Age

INTRODUCES

Gerald D. Strong, general manager appointed president, HOMER FOUNDRY CORP., Coldwater, Mich.

Nathan Lockshin, elected vice-president in charge of Fabricating Sales, BUILDERS STRUCTURAL STEEL CORP., Cleveland.

W. C. Whitehead, elected executive vice-president, THE GARRETT CORP., Los Angeles.

Jules E. Alexandre, elected vice-president in charge of sales, DUCHESS APPLIANCE MFG. CO., Alliance, Ohio.

Harold F. Keyes, Jr., elected assistant secretary, BROWN & SHARPE MFG. CO., Providence.

W. H. Jameson, named assistant chief engineer, BETHLEHEM STEEL CO., Bethlehem, Pa.

B. Bennecoff, becomes comptroller, MISSISSIPPI FOUNDRY & MACHINE CO., Jackson, Miss.

Douglas B. Littlewood, elected secretary, NATIONAL GYPSUM CO., Buffalo; and Fred A. Wagner, elected assistant treasurer and auditor.

Lawson Van Ormer, appointed superintendent, Tin Plate Dept., Aliquippa Works Div., JONES & LAUGHLIN STEEL CORP., Pittsburgh; and A. T. Albright, named chief metallurgist.

Ernest S. Kopecki, named assistant to the public relations manager, THE CARBORUNDUM CO., Niagara Falls, N. Y.

Eugene C. Bauer, Jr., elected a director, PIONEER ENGINEERING WORKS, Minneapolis.

Carl R. Freberg, appointed assistant director, Research Laboratory, Bellwood, Ill., BORG-WARNER CORP.

Edward L. Bohn, appointed research consultant on furnace maintenance and construction, MULLITE REFRACTORIES CO., Shelton, Conn.

Kenneth D. True, elected vice-president and general manager, United Stove Co., Ypsilanti, Mich., a subsidiary of GAR WOOD INDUSTRIES, INC.

T. Chase Carhart, promoted to consulting engineer, PITTSBURGH BRIDGE & IRON WORKS; Paul G. Nagle, named chief estimator; and Harry R. Cameron, appointed chief engineer.

Admiral A. G. Noble, USN (Retired) has been elected executive vice-president, a member of the Executive Committee and a member of the board of directors, NORDBORG MFG. CO., Milwaukee.

Joseph B. Larkins, appointed assistant director of Industrial Relations, THE MIDVALE CO., Nicetown, Pa., and James R. Steele, appointed sales manager, Chicago district.

Christian E. Jarchow, elected a director of POOR & CO., Chicago.

Robert G. Hamilton, appointed manager of radio sales, Radio & Television Div., SYLVANIA ELECTRIC PRODUCTS INC., Buffalo.

Kenneth D. Mackenzie, made assistant chief engineer, New Departure Div., GENERAL MOTORS CORP.; and Raymond J. Lynch, named assistant chief engineer.

Richard T. Nalle, Jr., named manager of production, Aviation Gas Turbine Div., WESTINGHOUSE ELECTRIC CORP., Philadelphia.

John G. Bannister, appointed sales manager, NATIONAL AUTOMOTIVE FIBRES, INC., Detroit.



ROGER M. BLOUGH, elected a director and a member of Finance Committee, United States Steel Corp., New York.



ETHAN A. BALL, appointed chief engineer, Bethlehem Steel Co., Bethlehem, Pa.



WILLIAM J. KINGSLEY, appointed assistant general sales manager, The Carborundum Co., Niagara Falls, N. Y.

Personnel

Continued

John I. Somers, promoted to sales manager for Worksaver electrically-operated hand lift trucks, THE YALE & TOWNE MFG. CO., Philadelphia; and T. F. Moriarty, appointed sales manager for manually-operated hand lift trucks.

Ralph W. Ziegler, appointed division controller, Chemical Plants Div., BLAW-KNOX CO., Pittsburgh.

George E. Jennings, appointed west coast district manager, DAVEY COMPRESSOR CO.

P. C. Foote, appointed assistant manager, Foreign Sales, CUTLER-HAMMER INC., Milwaukee.

Leo Monroe, named manager, Machine Tool Div., THE CASE CHEMICAL CO., Cleveland.

Thomas E. Pickering, appointed sales promotion manager, FIRTH STERLING INC., Pittsburgh.

William E. McCullough, appointed Tri-State sales engineer, CAPEWELL MFG. CO., Hartford.

William Cecil Jones, promoted to comptroller, ALABAMA BY-PRODUCTS CO., Birmingham, Ala.; John K. Black, promoted to auditor; and R. Weaver Self, made chief accountant.

Joseph N. Schicker, transferred to the St. Louis Office, PENINSULAR GRINDING WHEEL SALES CORP., and Joseph A. Srebalus, transferred to the Indianapolis Office.

W. H. Tonner, appointed factory representative, JACKSON & CHURCH CO., Saginaw, Mich.

Jackson D. Leonard, named senior associate, R. S. AIRES & ASSOCIATES, New York.

William B. Lewis, Jr., of Torrance, Calif., appointed west coast sales representative, BOHN ALUMINUM & BRASS CORP.

John S. Devlin, appointed district sales manager, Houston district, CONTINENTAL CAN CO., INC., and Bruce R. Petersen, appointed district sales manager, Milwaukee district.



DONALD W. DAWSON, appointed manager of sales, Building Products Div., The American Welding & Mfg. Co., Warren, Ohio.



LUTHER D. SHANK, named assistant to vice-president, National Electric Products Corp., Pittsburgh.



GEORGE B. FIELD, named industrial relations manager, Higgins, Inc., New Orleans.



JOHN V. SCHWEPPE, appointed production superintendent, Pittsburgh Plate Glass Co.

SEND FOR

WILMOT CONVEYOR

BULLETIN 502



**As Originators of
Rivetless Chain, Wilmot
Offers Widest Choice of Chain
Sizes and Conveyor Attachments**

The booklet contains engineering data on rivetless chain in pitches from 3" to 10 1/4" and working loads from 3,000 to 130,000 lbs.; of drop-forged steel, alloy or cast chrome-manganese steels. Wilmot not only stocks the largest choice of chain sizes, but also furnishes the widest range of other con-

veyor parts: sprockets, traction wheels, flights, take-ups, shafting, bearings and trough in cast iron, ductile iron, carbon or chrome-manganese steel to fit the application. See why an increasing number of leading firms are cutting "down" time by depending on Wilmot for all conveyor replacement parts.

WILMOT ENGINEERING CO.

HAZLETON, PA.
Foundry and Shops:
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there's a "right"
tool for every job

and
a "right" fastener...

You wouldn't intentionally slow down your production lines with inefficient tools or use the wrong machine for the job at hand. Isn't it equally logical to make sure that every fastening job is done with a fastener that is "just right"?

Differences in hardness and thickness of the tapped material require selection of the right type of tapping screw thread. This, in turn, works best with selection of the right hole size.

Lamson fastener engineers can advise you how to reduce the variety of fasteners and sizes at each assembly station, cut costs and improve assembly. Lamson control of quality and Lamson design produce low drive torques—high strip torques. Solve your fastening problems with Lamson Tapping Screws.



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Lamson
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Precision made for fast economical assembly.



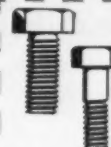
SEMS

Pre-assembled lockwashers on tapping and machine screws.



TAPPING SCREWS

Choice of round, pan, truss, flat oval, hexagon and Phillips heads.



CAP SCREWS

"1035" Hi-Tensile Heat-treated steel.



SQUARE AND HEX MACHINE SCREW NUTS

Semi-finished, hot pressed, cold punched.



LOCK NUTS

Economical, vibration proof. Can be used repeatedly.



COTTER PINS

Steel, brass, aluminum and stainless steel.



"1035" SET SCREWS

Cup point type, hardened and heat-treated.

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THE GEAR THAT COULDN'T BE MADE!

Designers specified powdered metal for this two inch helical gear to avoid the high cost of production by conventional methods. But the combination of helical gear teeth with the axial elements of the clutch collar presented an unusual problem in powdered metal fabrication.

That's why they came to Powdered Metal Products Corporation of America . . . the gears, made from a special bearing bronze in production quantities, cost less than fifty cents each!

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CORPORATION of America**

9335 West Belmont Avenue,
Franklin Park, Illinois

^{*}Trademark

Personnel

Continued

George L. Dirks, appointed general manager, BLAW-KNOX DIV., at Blawnox, Pa., of Blaw-Knox Co.

Richard P. McCarthy, named sales representative, Kansas City office, General Machinery Div., ALLIS-CHALMERS MFG. CO.; Raymond W. Davis, named sales representative Peoria office; and Roger T. Ellis and William T. Farnsworth have been named sales representatives also for the New Haven district office.

Robert E. Hensley, joins Tulsa office, THE COOPER-BESSEMER CORP.

Arnold S. Larsen, assigned to New York office as field representative, BULLDOG ELECTRIC PRODUCTS CO., Detroit and Kirklin L. Kelly, named field representative, Huntington, W. Va.

S. F. McDermott, appointed traffic representative, AMERICAN CAR & FOUNDRY CO., New York.

Philip G. Brumder, appointed general manager, newly created Hydraulic Control Div., BLACKHAWK MFG. CO., Milwaukee.

T. H. Brady, appointed to newly-created position of assistant manager of sales, Cold Finished Products, JONES & LAUGHLIN STEEL CORP., Pittsburgh.

Arthur I. Schell, appointed manager of operation methods, THE MID-VALE CO., Nicetown, Pa., Plant.

Robert W. Crozier, appointed regional manager in charge of Pittsburgh and Cleveland Offices, Electro Metallurgical Co., a division of UNION CARBIDE & CARBON CORP., and Herman J. Pfeifer, has been made district manager, new sales office in Houston.

Glenn E. Maxfield, appointed plant superintendent, THE AMERICAN BOX CO., Cleveland.

J. C. Evans, appointed assistant controller, WAGNER ELECTRIC CORP., St. Louis.

Edmund D. Bachand, appointed manager, Detroit Branch office, MOORE PRODUCTS CO. He succeeds J. E. Gambrell, who becomes manager, new branch office in New York City.

OBITUARIES

W. B. Robinson, former Pittsburgh advertising manager THE IRON AGE, at his farm in Wildwood, Hampton Township, Pittsburgh.

HOW GOOD IS THE CHARPY IMPACT TEST?



By C. A. Penrose
Metallurgist
Watervliet Arsenal
Watervliet, N. Y.

To determine the reliability of the "V" notch Charpy test and its reproducibility one strength level of steels of uniform microstructure was thoroughly tested. Steels of 150,000 to 160,000 psi yield strength, having impact strength of 20 to 30 ft-lb when tested at -40°F produce a variation of ± 1.8 or 3.5 ft-lb. Within these limits and only for this set of conditions the Charpy "V" notch test is reliable. Reporting of impact values to more than one place after the decimal or even in halves of foot pounds is not necessary. The method of machining the tests has no influence on results if the specimens meet the specification on the drawing.

The reproducibility of Charpy impact test data, particularly the "V" notch Charpy impact test data, is a very much discussed subject among the majority of steel producers. It is argued by one group that any two machines, no matter how carefully calibrated, will produce results in great variance with each other when testing similar or even the same material. Another group declares that all impact testing machines could be so calibrated that readings of energy values to one hundredths of ft lb can be obtained.

Still others feel that when testing materials of high tensile strength, which normally have low impact strength, a testing machine scaled to a low impact energy range (for example: 0-40 ft lb) capable of demonstrating energy values to the

second place after the decimal should be used. To evaluate these divergent opinions concerning the accuracy of the test, the author undertook a statistical analysis to determine the reproducibility of the present "V" notch Charpy impact test on high tensile strength material. In order to further magnify any variation, the author requested that all testing be conducted at a subzero temperature.

The project was conducted in two phases: (1) to determine what deviation might be obtained by the various testing machines operated by various technicians, and (2) to determine the deviation obtained when the test bars were machined at the various testing installations according to their standard machining practices. The objective of

"Material variations which could influence the test results . . . were avoided . . ."

this project was not to determine the variation in impact test data for any given type of material, but to determine the variation inherent to the test so that the selection of a very uniform material for the test coupons was most important. It was required that the steel to be used have very uniform mechanical properties at a high tensile strength level as well as completely consistent structural properties throughout the sampled length. Thus, material variations which could influence the test results indeterminately were avoided.

First one lot, and then a second lot of material was chosen for this program and was subsequently discarded because of indeterminate variables. The data obtained and later discarded are included in this report for informational purposes and to show, by comparison, the variations obtainable in test results if the material being tested is non-uniform.

The first lot of material consisted of 10 pieces, 2 in. x $\frac{3}{4}$ in. x 14 in. of SAE 4130 rolled steel bar stock which were heat treated in 2 batches of 5 pieces each. One hundred fifteen "V" notch Charpy test bars were machined from this material at Watervliet Arsenal. Hardness tests on the finished bars fell within the range of RC 36 to 42. The impact tests, conducted at -40°F , were performed at 6 installations. The results are shown in Table I. The average value of 115 tests was 28.5 ft lb, the spread of results was 17.0

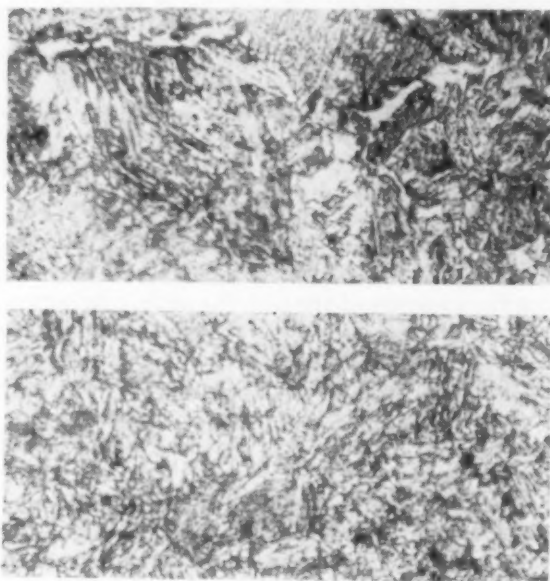


FIG. 1—Photomicrographs of test bars from 4130 rolled stock. Top photo typical of specimens having low impacts. Bottom photo shows structure having high impact strength. Mag. 1000x, nital etch.

to 44.73 ft lb and the calculated standard deviation was 5.3.

Metallographic examinations revealed pronounced structural differences between specimens of high and low impact strengths, see Fig. 1. Therefore, all data accumulated from this group of tests were disregarded in the final analysis because the variation due solely to testing machines and techniques could not be isolated from those due to the non-uniformity of the test material.

The second lot chosen, and also later rejected, consisted of individually heat treated coupons of forged steel tubing. Ninety-four "V" notch Charpy test bars were machined from this material. The hardnesses of these test bars again ranged from 36 to 42 RC. The data obtained from the 6 testing agencies can be summarized as follows: average of 94 tests, 20.9 ft lb; spread of results, 15.0 to 28.5 ft lb; standard deviation, 2.45.

Because it was felt that some inconsistency could have been introduced by the individual and manual quenching of 94 coupons, the data obtained were studied but were not used in reaching the final conclusions of this report.

Test pieces from tube forgings

The steel finally selected for the evaluation of the subzero test was taken from sections of tube forgings manufactured in 1945 which were known to have the high yield strength and uniform mechanical and structural properties.

The first lot of test bars, hereafter referred to as Lot I, were machined at Watervliet Arsenal from one of these sections. Transverse tensile tests were made at the beginning and the end of the sampled length. Results appear in Table II.

Starting 1 in. from the extremity of the forging, a series of $38\frac{3}{4}$ in. discs were cut. Transverse Charpy coupons were cut from the 3, 6, 9, and 12 o'clock locations of each disc and were marked to be notched towards the bore of the forging, see Fig. 2. One hundred forty-eight

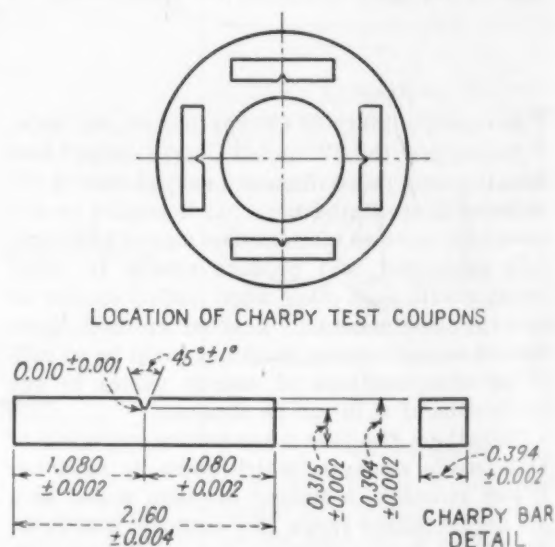


FIG. 2—Location and size of test specimens.

TABLE I

—40°F CHARPY TEST VALUES*
HEAT TREATED 4130 BARS MACHINED AT WATERVIET ARSENAL

Installation	A	B	C	D	E	F		
Group 1.....	34.0 35.0	24.0 23.5	37.35 34.2	24.9 21.4	31.5 29.5	26.5 Ft-lb 29.0 Ft-lb	Min. 21.4 Ft-lb Max. 37.35 Ft-lb	Avg. 29.2 Ft-lb
Group 2.....	26.0 27.5	31.5 30.5	38.95 34.20	27.1 26.4	26.5	27.5 Ft-lb 38.0 Ft-lb	Min. 26.4 Ft-lb Max. 38.95 Ft-lb	Avg. 30.8 Ft-lb
Group 3.....	24.0 38.0 31.0	27.0 35.0	37.35	21.4 23.5	29.7 24.8	34.0 Ft-lb 35.5 Ft-lb	Min. 21.4 Ft-lb Max. 38.0 Ft-lb	Avg. 30.1 Ft-lb
Group 4.....	27.0 29.0	31.0 32.0	25.98 26.69	27.1 29.2	27.3 29.3	33.0 Ft-lb 35.0 Ft-lb	Min. 25.98 Ft-lb Max. 35.0 Ft-lb	Avg. 29.8 Ft-lb
Group 5.....	24.0 27.0	33.5 26.0	44.73 38.95	26.69 22.8	26.0 31.3	35.0 Ft-lb 33.0 Ft-lb	Min. 22.8 Ft-lb Max. 44.73 Ft-lb	Avg. 30.7 Ft-lb
Group 6.....	19.0 22.0 33.5	29.0	23.85 36.56	24.9 18.2	33.0 32.0	26.5 Ft-lb 30.5 Ft-lb	Min. 18.2 Ft-lb Max. 36.56 Ft-lb	Avg. 27.4 Ft-lb
Group 7.....	17.0 23.5	32.0 20.5	24.56	22.8 23.5	18.7 21.8	32.5 Ft-lb 33.5 Ft-lb	Min. 16.7 Ft-lb Max. 33.5 Ft-lb	Avg. 24.4 Ft-lb
Group 8.....	31.5 34.0	22.0 19.0	34.98 24.56	17.5 20.0	21.2 33.3	29.0 Ft-lb 28.5 Ft-lb	Min. 17.5 Ft-lb Max. 34.98 Ft-lb	Avg. 26.6 Ft-lb
Group 9.....	33.0 34.0	28.5 23.0	23.85 33.43	18.8 20.7	27.0 35.0	29.0 Ft-lb	Min. 18.8 Ft-lb Max. 35.0 Ft-lb	Avg. 27.6 Ft-lb
Group 10.....	20.0 21.0	30.0 31.0	34.98 31.89	16.9	32.8 36.5	26.5 Ft-lb	Min. 16.9 Ft-lb Max. 34.98 Ft-lb	Avg. 29.2 Ft-lb
Average.....	26.0	28.0	32.0	23.0	28.7	31.0 Ft-lb	Average of 115 Tests:	28.5 Ft-lb
Minimum.....	17.0	19.0	23.85	16.9	16.7	26.5 Ft-lb	Standard deviation for the lot:	5.3
Maximum.....	38.0	35.0	44.73	29.2	36.5	38.0 Ft-lb		

* These data were not used for the final analysis because of the inconsistency of the tests, presumably due to the heat treatment.

TABLE II
MECHANICAL PROPERTIES v. TEST POSITION

	Y. S.	T. S.	El.	R. A.
Extremity				
12 o'clock position.....	152,000	165,000	15.0	41.1
6 o'clock position.....	152,000	166,000	14.0	40.1
39 in. from extremity				
12 o'clock position.....	152,000	165,800	15.0	41.1
6 o'clock position.....	152,000	166,000	14.0	40.1

test bars were machined from these coupons, and were examined by three different inspectors who pronounced them acceptable. Two Rockwell hardness tests were made on each of the finished bars. The same Rockwell tester was used for all the tests and it was calibrated after every 20 tests.

One operator conducted all the tests. The range of hardness values obtained was 37.0 to 39.0 RC.

The 148 test bars were divided among 11 testing laboratories which included 2 government laboratories, 3 foundries and 6 forging companies. It was requested that the test specimens be cooled to -40° (tolerance: -2°F), held 30 min at temperature and then tested. The data obtained are contained in Table III. From these data a frequency curve and a modified control chart (Fig. 3) was drawn. Using all of the information derived from the tests, the following were computed: average of 148 tests, 23.5 ft lb; spread of results, 19.4 to 30.0 ft lb.

The standard deviation, based on the relationship of the individual tests to the mean was 1.86. Standard deviation, based on the relationship of

TABLE III

—40°F CHARPY TEST ON ACCEPTABLE MATERIAL
(LOT I)

	A	B	C	D	E	F	G	H	J	K	L
25.0	24.5	23.17	21.4	24.0	23.0	30.0	25.5	25.0	24.5	23.0 Ft-lb	
24.5	22.0	23.17	20.7	20.8	23.0	27.0	25.25	23.5	23.0	24.0 Ft-lb	
22.5	23.5	23.85	20.7	23.5	23.0	28.0	25.0	23.0	24.0	22.0 Ft-lb	
25.0	20.5	23.85	20.0	20.7	22.0	26.0	25.25	23.0	24.0	23.5 Ft-lb	
21.0	22.5	24.56	22.1	24.4	22.0	26.0	23.75	23.5	23.0	23.0 Ft-lb	
20.5	21.0	21.11	21.4	23.5	22.5	24.5	24.5	22.5	24.0	23.0 Ft-lb	
24.5	27.0	21.11	20.0	21.2	24.5	29.0	26.0	23.0	23.5	24.0 Ft-lb	
22.5	27.0	21.79	19.4	22.7	22.5	29.0	25.25	24.5	24.0	23.0 Ft-lb	
22.0	22.5	21.79	22.8	21.8	22.5	26.0	24.25	22.5	23.5	24.0 Ft-lb	
23.5	24.0	23.85	22.8	23.2	22.5	27.5	25.0	23.0	23.0	23.0 Ft-lb	
22.0	23.0	23.85	21.4	23.7	23.0	26.5	25.5	23.5	24.0	24.0 Ft-lb	
24.0	23.0	23.85	21.4	22.0	22.0	.....	.....	.....	.....	23.5 Ft-lb
23.0	21.0	24.56	22.1	23.2	25.0	.....	.....	.....	.....	.....
22.5	23.0	25.26	22.1	22.8	25.0	.....	.....	.....	.....	.....
24.8	21.0	23.85	19.4	20.3	23.0	.....	.....	.....	.....	.....
22.5	23.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average	23.1	22.6	23.3	21.2	22.5	23.2	27.4	25.2	23.3	23.7	23.3 Ft-lb
Minimum	20.5	20.5	21.11	19.4	20.3	22.0	24.5	24.5	22.5	23.0	22.0 Ft-lb
Maximum	25.0	27.0	25.26	22.8	24.4	25.0	30.0	26.0	25.0	24.5	24.0 Ft-lb

Total No. of Tests: 148
Std. deviation for the lot: 1.86

Average (arithmetic) of total tests: 23.5 Ft-lb
Std. deviation based on the averages from each installation: 1.54

"In each analysis standard deviations . . . have been used to demonstrate variation . . ."

TABLE IV

MECHANICAL PROPERTIES v. TWO TEST POSITIONS

	Y. S.	T. S.	El.	R. A.
Extremity.....	156,000	170,000	15.0	42.3
45 in. from extremity				
12 o'clock position.....	155,200	169,500	15.5	42.9
6 o'clock position.....	156,000	170,400	....	41.9

each installation's average to the mean was 1.54.

From a study of Fig. 3, the results of tests made by installation G show the greatest deviation. A review of Table III showed that G had only one test result (24.5 ft lb) within the deviation limit (average of tests 23.5—standard deviation 1.86. Therefore, solely for informational purposes, all the data from G were eliminated and the remaining data recalculated. On this basis, the average of 137 remaining tests became 23.1 and the computed standard deviation dropped to 1.63. The difference between 23.5 and 23.1 or 1.86 and 1.63 was not sufficient to warrant further consideration but such a slight difference does demonstrate the adequacy of the sampling.

Hardness varied among testing labs

The second lot of test bars used in this analysis (Lot II) consisted of 166 test coupons, roughed out and marked for notching at Watervliet Arsenal, which were distributed among the testing installations for finish machining and sub-zero testing.

Tensile tests were made at the extremity and 45 in. from the extremity of the tube forging used. The results of the tensile tests are shown in Table IV.

Each installation made Rockwell hardness tests on each finished bar. The test bars ranged in hardness, as reported, between 34.5 and 39.0 RC with the majority of the hardnesses falling 36.5 and 38.0 RC. The microstructures indicated consistent tempered martensite structure as shown in Fig. 4.

Again the test specimens were cooled to -40°F , held at temperature for 30 min and then tested. The data obtained are contained in Table V. These data can be summarized as follows: average of 166 tests, 23.0 ft lb; spread of results, 20.0 to 29.0 ft lb.

The standard deviation, based on the relationship of the individual tests to the mean was 1.70. Standard deviation, based on the relationship of

installation averages to the mean was 1.43. A modified control chart, Fig. 5, was plotted demonstrate these relationships.

Once again, all of the results from installation G fell above and outside the deviation limits. By eliminating G's data the average of the tests became 22.7 and the standard deviation for the individual tests became 1.3. Here the elimination of G's data has shown a slightly greater difference, see Fig. 6, as compared with Fig. 5 for Lot I, but the difference is so slight that it can be disregarded, because the object was not to determine the true mean or deviation but was rather to determine the actual variations in Charpy results when the tests were performed on different testing machines and by different operators.

In each analysis, standard deviations, in its usual plus or minus sense, have been used to demonstrate variation. The factor, "deviation," was considered by the author more applicable than "percentage error" or "percent variation" because (1) standard deviation permits ready transposition into whatever energy or strength is under discussion, and, (2) the percent variation increases as the base unit decreases thereby giving the impression of greater variation when small base units are being evaluated.

Machining has little influence

The test bars machined at Watervliet Arsenal were roughed out on shapers, ground to size on all 6 sides and "V" notched in a total of 3 passes with a 45° notch Hi-Speed form milling cutter on a horizontal milling machine. For the notching operation, 5 or 6 specimens were ganged in a fixture. The specimens which were distributed to the installations participating in this program were finished machined by whatever machining method was the standard practice for each individual shop. Some of the specimens were shaped and ground, some were straddle milled, some were notched in one pass, others were notched in multiple passes and still other methods were used by other shops. However, it has been concluded, from the results shown above, that the method of machining has little influence

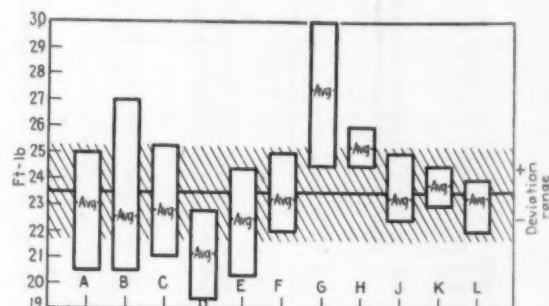


FIG. 3—Relationship of data to mean and to standard deviation from installation "G."

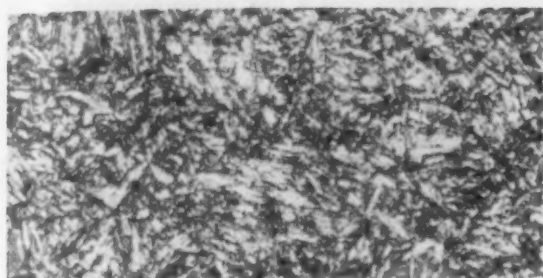
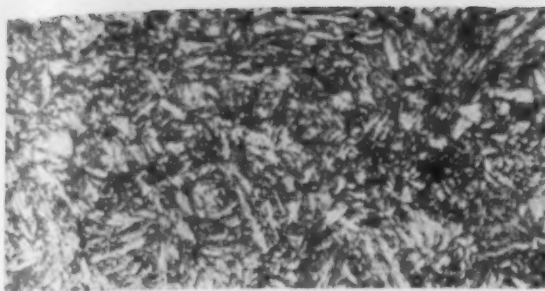


FIG. 4—Typical microstructures of acceptable material. Top photo is transverse while bottom photo shows longitudinal sections. Mag, 1000x, nital etch.

on the tests results if the test specimens meet the drawing specifications.

The data used (Lots I and II) cannot be construed to reflect the variations that might be encountered among impact tests of non-uniform or heterogeneous material which might, and probably is, encountered in normal manufacturing practices. However, a standard deviation of 5.3 (normal variation of 10.6 ft lb) was obtained by the impact testing of a nonhomogeneous material as compared with the 1.70 and 1.86 standard deviations (approx 3.5 ft lb of probable spread) determined from the impact testing of steels of optimum homogeneity.

If the low temperature impact testing of as nearly homogeneous material as is available in the 150 to 160,000 psi yield strength range, having impact energy within the range of 20 to 30 ft lb, will produce a probable variation of ± 1.8 , it may be concluded that the present Charpy impact test is not unreliable. If such variation is probable, then the reporting of impact energy values to more than one place after the decimal or to even more than halves of foot pounds should not be necessary.

TABLE V

—40°F CHARPY TEST VALUES
(LOT II)

	A	B	C	D	E	F	G	H	J	K	L
	21.5	24.0	21.11	23.5	23.2	24.0	25.5	25.5	23.0	22.0	21.5 Ft-lb
	21.0	24.0	21.11	22.1	21.8	24.0	26.0	24.5	23.0	22.5	22.5 Ft-lb
	22.0	23.0	21.79	21.4	23.2	24.0	26.5	25.75	23.0	22.0	22.5 Ft-lb
	20.0	23.0	21.11	23.5	20.8	25.0	27.5	23.0	23.5	23.5	23.5 Ft-lb
	20.5	24.0	21.79	21.4	21.8	25.5	25.5	24.5	24.0	22.0	23.5 Ft-lb
	21.0	23.0	21.79	22.1	21.8	26.0	28.0	23.5	23.0	22.0	21.0 Ft-lb
	20.5	23.0	21.11	22.1	22.2	24.0	26.0	25.25	23.0	25.0	21.5 Ft-lb
	20.0	25.0	21.11	22.1	23.6	26.0	29.0	25.5	23.0	22.5	22.5 Ft-lb
	22.0	24.0	22.47	22.1	21.1	24.0	25.5	24.75	23.0	22.0	23.0 Ft-lb
	21.0	24.0	22.47	22.1	22.2	23.0	25.5	23.25	21.5	23.0	24.0 Ft-lb
	21.5	24.0	21.79	20.1	22.2	22.2	25.0	23.5	23.5	22.5	23.5 Ft-lb
	21.8	24.0	21.79	22.8	21.1	22.5	27.5	23.75	23.0	23.5	23.0 Ft-lb
	20.5	24.0	21.11	23.5	20.8	21.5	27.0	24.75	22.0	23.0	24.0 Ft-lb
	20.5	23.0	21.79	22.1	22.9	23.0	26.0	24.75	22.0	22.0	22.0 Ft-lb
	22.0	24.0	21.11	21.4	22.2	23.0	25.5	23.5	22.5	22.0	23.5 Ft-lb
	21.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average	21.0	23.7	21.56	22.2	22.06	23.8	26.4	24.4	22.8	22.6	22.8 Ft-lb
Minimum	20.0	23.0	21.11	20.1	20.8	21.5	25.0	23.0	21.5	22.0	21.0 Ft-lb
Maximum	22.0	25.0	22.47	23.5	23.6	26.0	29.0	25.75	24.0	23.5	24.0 Ft-lb

Total No. of tests: 166
Std. deviation for the lot: 1.70

Arithmetic Average of total tests: 23.0 Ft-lb
Std. deviation used on the averages from each installation: 1.43

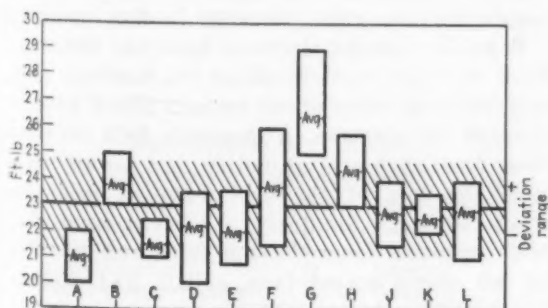


FIG. 5—Relationship of data to mean and to standard deviation in the form of a control chart.

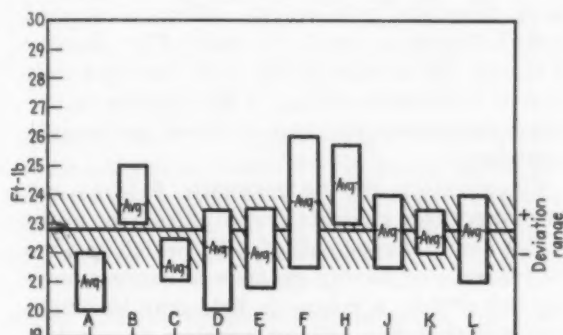


FIG. 6—Relationship of data to mean and to standard deviation with installation "G" data.

How Ferromagnetism Works



By R. H. Esling

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Industry makes use of ferromagnetism in dozens of ways. Electric generators and motors, lifting magnets, solenoids in switches and valves, and permanent magnet applications are a few. A knowledge of the basic principles of ferromagnetism is useful in understanding the varied equipment in your plant which makes use of ferromagnetism.

The magnetic field is a force field. Other examples of force fields are the earth's gravitational field and the electric field between charged conductors. The magnetic field is important for two reasons:

It may be used to do work. Large lifting magnets may do many thousands of ft-lb of work per day while the magnet in a small solenoid valve does only a few ft-lb per day. But the principle is the same in either case.

Equally important, an electrical conductor moving in this field provides a voltage source. Here again, the range of applications is wide, from huge dynamos to tiny vibration indicators in which a small coil moves in the field of a permanent magnet.

A magnetic field exists whenever an electron is in motion. This means that a magnetic field can be made at a given point in space by causing electrons to move in the vicinity of that point. The electric current in a solenoid does just this.

The concept of flux density has been developed to describe the magnetic field. Imaginary lines of force are often used to visualize the force field. These are the paths which an isolated magnetic pole might follow if started from different points in the field. Flux density is simply the number of lines of force per unit area of field cross section. A flux density of one gauss represents one line of force per square centimeter.

Visualization of the magnetic field is not necessary for quantitative studies. In a toroidal donut-shaped coil of wire, which has the convenience of having no ends to cause annoying end effects, a magnetic field may be established within the coil by passing an electric current through the wire.

Now, if the coil be placed in air, the flux

density at the axis of the coil may be expressed by the relationship

$$1. \quad B = k4\pi i (N/L)$$

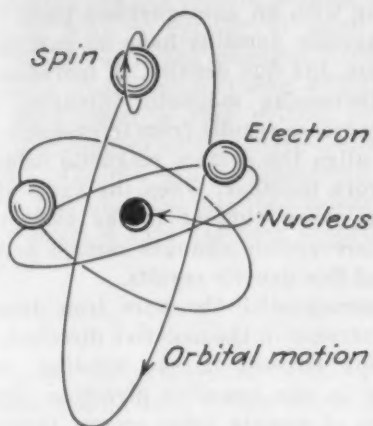
where B is the flux density, k is a constant, i is the electric current in the wire, and N/L the ratio of coil turns to coil length. Confusion enters in the applications of this equation because several different systems of units are currently in use. The centimeter-gram-second system is the traditional system, and probably the most widely used. By this system of units the flux density, B , will have dimensions of gauss when the current is given in abamperes (amperes divided by ten) and the coil length given in centimeters. Using the line of force device for visualization, one gauss is represented by one line per square centimeter. The constant, k , equals one in this system.

Certain metals increase flux density

If some substance other than air be used to fill the coil, Equation 1 will apply in most cases. A second term must, however, be added to the right side when iron, cobalt, or nickel are used for coil core material. This second term accounts for the great increase in flux density.

For any atom the electrons have two motions. Each electron revolves about the nucleus, and each electron spins about an axis which passes through the electron. A magnetic field results, then, from each orbital motion, but for any one atom the sum of the orbital-motion fields is practically zero. Similarly, in a given atom, the fields resulting from electron spins sum to zero for all atoms except iron, cobalt, and nickel. These are the atoms with permanent magnetic fields of appreciable magnitude.

In crystals these atomic fields interact to

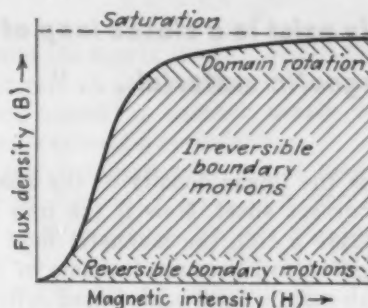


REVOLUTION and spin motions of an electron in an atom.

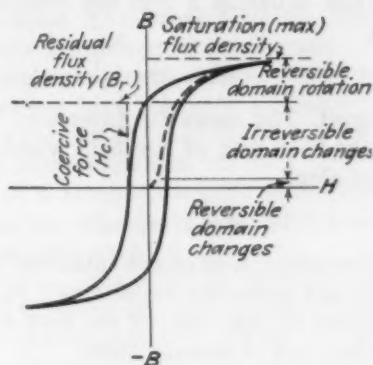
form small domains in which all the atomic fields are parallel. These domains become small permanent magnets. Neighboring domains do not necessarily have parallel magnetic fields. An unmagnetized piece of iron or steel is composed of many such domains. The random arrangement of the domain fields in this piece causes the net magnetic field to be zero for the entire piece.

The magnetization of iron is a process of changing domain boundaries and rotating domain fields so that the random arrangement is replaced by some degree of preferred orientation. Application of a weak magnetic field to an unmagnetized piece of iron initiates reversible boundary motions. Domains having fields nearly parallel to the applied field grown at the expense of domains not so aligned. Increasing the strength of the applied field but oppositely directed turn completely around. Finally, as the applied field is further increased, magnetic saturation is approached by reversible rotation of domain fields. A magnetically saturated piece of iron has all of its domain fields parallel to the applied field.

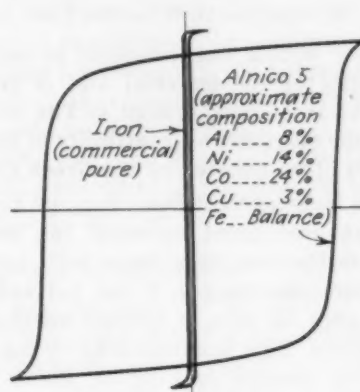
It is sometimes convenient to imagine that the field within a magnetized bar is due to an electrical current sheet flowing around the bar



MAGNETIC domain changes at different magnetization stages.



TYPICAL magnetization curve and hysteresis loop.



COMPARISON of hysteresis loops for iron and for Alnico 5.

DEFINITIONS OF TERMS

Centimeter-Gram-Second System		
Concept	Symbol	Dimension
Flux density	B	Gauss
Magnetizing intensity or magnetizing force	H	Oersteds
Intensity of magnetization	I	Gauss
Flux	Φ	Maxwells
Permeability	μ	Gauss/Oersted

on its surface. Similarly, it is convenient to imagine that the magnetic field within a coil is the result of a current sheet which has a linear density equal to 1 (N/L). Then equation 1 for an air-cored coil may be written

$$B_1 = k4\pi j$$

where j is the linear current density. For the magnetized iron bar we may write

$$B = k4\pi j_s$$

"A high residual flux density can only exist in a closed loop of good magnetic material . . ."

where j is the linear density of the imaginary surface current sheet. Now if the iron bar be placed inside a coil, the magnetic field within the iron-cored coil becomes the sum of the net field which results from a preferred orientation of domains, and the field which results from the current in the coil. The flux density for such a case becomes

$$2. \quad B = k4\pi js + k4\pi j$$

It is from equation 2 that the common relationship

$$B = \mu H$$

is developed. The magnetic intensity, H , is a measure of that part of the field which is due to the coil alone.

$$H = k' 4\pi j$$

Another quantity, termed the intensity of magnetization and generally denoted by I , is defined as a measure of that part of the field which is due to alignment of domain fields.

$$I = (k/k') js$$

The factor k' is a constant. Then equation 2 may be written

$$B = [(k') 4\pi (I/H) + (k/k')] H$$

The factor within the brackets is called the permeability of the material and is generally denoted by the Greek symbol μ . The ratio I/H is called the magnetic susceptibility of the material and is often denoted by the Greek symbol γ .

When a large current flows through the winding of an iron-cored solenoid the magnetic domains in the core experience both reversible and irreversible changes. If the current in the winding goes to zero, a certain residual flux density exists. This is determined by the degree of magnetic domain orientation which results from the irreversible changes during magnetization. The reversible changes which occurred revert to their original state.

The magnetization and demagnetization of

pure iron illustrate this in a marked manner. Starting with an unmagnetized piece, in which the magnetic domains have no particular field direction, the flux density, B , increases rapidly with increasing magnetic intensity, H . This rapid increase results from irreversible changes which align the domain magnetic fields so that they work together. When the value of H goes to zero, when current in the solenoid is off, these irreversible changes remain and a large residual flux density results.

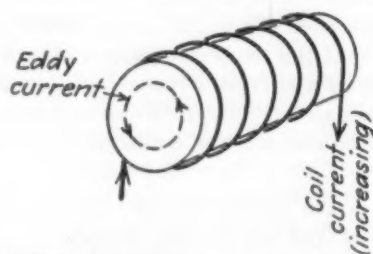
To demagnetize the pure iron doughnut H must increase in the negative direction, done by reversing current in the winding. As H increases in the negative direction irreversible rotation of domain fields occurs. Generally the domain fields change direction by 180° . A flux density of zero exists when the antiparallel domain fields cancel the parallel fields. The negative magnetic intensity value required to establish this is termed the coercive force.

Hysteresis, is lag of flux density.

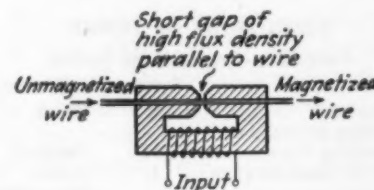
The lag of flux density in the iron behind the applied magnetic intensity is called hysteresis. It represents a loss of useful work. It is common experience that, although work is done in stretching a tempered steel spring, the spring will do work in reverse when released. A spring wound of lead wire, however, does little work after being stretched. The work put into stretching the lead wire spring cannot be regained, and the change is thus irreversible. Similarly, the work needed to cause the irreversible changes in magnetic domains cannot be regained. Hysteresis measures this lost work.

Impurities in the iron tend to increase the hysteresis. Alloys having large hysteresis, and consequently large coercive force values, are used as permanent magnet materials. The Alnico family of alloys uses aluminum, nickel, cobalt, and copper as alloying elements.

The high residual flux density which remains after magnetizing a torrodial iron solenoid core to saturation is considerably reduced by sawing through the doughnut at one point. A high residual flux density can only exist in a closed loop of good magnetic material. Introducing a poor magnetic material, such as air, in the flux path has the same effect as increasing the magnetic intensity in the negative direction. Partial demagnetization results.



EDDY CURRENT direction within a solenoid core.



SCHEMATIC sketch of a wire recorder magnetizing head.

Straightening the cut torroid to make a helical solenoid with a cylindrical core would increase the air gap in the magnetic circuit and thus increase the demagnetizing effect. This demagnetizing effect is very evident in short rods of iron. Cylinders whose length-to-diameter ratio is less than five will be considered short. The effective value of the magnetic intensity, H , in a short solenoid core has been described by the equation

$$3. \quad H = \frac{H_0 - DB}{1 - \mu_0 D}$$

where H_0 is the actual magnetic intensity which results from the current in the solenoid, D is the demagnetizing factor which may range from zero to unity, H_0 is the permeability of free space ($H_0 = 1.0$ in the c.g.s. system of units), and B is the flux density.

From this it may be seen that, when the demagnetizing factor is appreciably greater than zero, H is less than H_0 . When H_0 is zero, with no current in the coil, H is negative for positive flux density values. Relatively speaking, a short permanent magnet in air has little residual magnetism. A short magnet may, however, be useful in a magnetic circuit which has only a small air gap.

Faraday's Law applied

When there is any relative motion between an electrical conductor and a magnetic field, the free electrons in the conductor are displaced and a potential difference exists between different parts of the conductor. The simplest electrical generator would be a straight wire of length l moving with a velocity v in a plane perpendicular to a uniform magnetic field of constant flux density, B . The potential difference developed between the ends of the conductor is, by Faraday's Law,

$$4. \quad E = KBV$$

where K is a constant. E will be in volts when K has the value 10^8 , B is measured in gauss, l is in centimeters, and V in centimeters per second.

The product of an increment of time, dt , and velocity is a small distance. Then this product multiplied by l represents an increment of area. An increment of flux, $d\phi$, may therefore be defined as

$$d\phi = B l v dt$$

Faraday's Law may now be written

$$E = - \frac{d\phi}{K dt}$$

The negative sign is introduced to accommodate the traditional direction of positive potential drop.

Instead of a straight conductor in a magnetic field consider a coil in a magnetic field. For a coil of N turns the last equation becomes

$$E = - KN \frac{d\phi}{dt}$$

Sometimes the flux in the coil, and consequently the time rate of change of flux, $d\phi/dt$, is due to a varying current in another, nearby coil. Such a system is termed a transformer.

The self inductance of a coil may also be defined by Faraday's Law. Consider the form $E = -K d\phi/dt$. When the current in the coil changes by an amount di the flux through the coil changes by an amount $d\phi$. Therefore,

$$E = - \frac{di}{L dt} \text{ where } L \text{ is a constant relating } d\phi \text{ and } di.$$

This constant is characteristic of the coil and its core, called the self inductance of the coil. For an air-cored coil L is independent of the current, but for an iron-cored coil L depends upon the current since the flux density in the core depends upon the current.

Iron conducts electricity sufficiently well that whenever the flux changes in a magnetized piece of iron a current flows in the iron. This current flows at right angles to the field direction and generates a second magnetic field which tends to oppose the change in flux. Such a current is called an eddy current.

Suppose an iron cylinder were wrapped with a coil of wire and an alternating current passed through the coil. As the current changes in the coil the induced field at the surface of the cylinder would start to change. The change would be opposed by the eddy current field so that the full value of the field change would not be transmitted to the axis of the cylinder. In fact, the field strength at the axis of the cylinder would never reach the maximum value of the surface field strength. The time lag might even be such that the instantaneous field at the center could be opposite to the field at the surface. Eddy currents cause the average maximum field strength to be less than the maximum induced field strength.

Eddy current losses reduced

They are generally to be avoided or minimized. When eddy currents are present a loss of field strength occurs through the reduction of field penetration. Moreover, a power loss occurs which is proportional to $i^2 p$ where i is the eddy current density and p is the resistivity of the iron. Both types of eddy-current losses may be reduced by building the flux paths of magnetic circuits with laminated pieces.

Both the force-field aspect and the current-generator aspect of the magnetic field are widely used. The great magnets which are used to handle pig iron are a common sight to foundrymen. Eye specialists use a much smaller electromagnet to remove steel particles from the eye.

Extensive use of pneumatics and hydraulics in modern mechanisms gives rise to many applications of magnetically operated valves. Often

**"The magnetic wire recorder . . .
became practical . . . when a
young Chicago physicist . . ."**

a cascade of valves is used as a power amplifier so that large amounts of power may be controlled by a small electric current flowing in the coil of a small solenoid valve.

The magnetic wire recorder, developed in the early days of the war, became practical when a young Chicago physicist designed a magnetic circuit which was able to magnetize very short segments of a steel wire having high coercive force. The success of his magnetic circuit design lay in the fact that the direction of magnetic polarity was always parallel to the axis of the wire. Rotational position of the wire as it ran through the playback pick-up was thereby made unimportant.

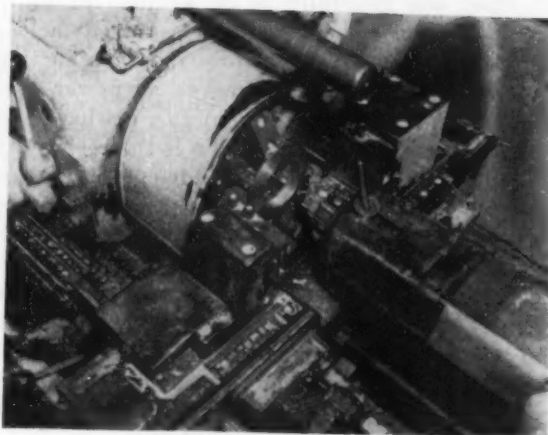
The playback pick-up of the wire recorder is simply a coil through which the magnetized wire passes. As each tiny, magnetized segment of wire passes through the coil a voltage is

generated in the coil. This voltage increases and decreases as the succession of small segments increase and decrease in degree of magnetization. It is essential that the wire pass through the magnetizing head and the playback pick-up at a constant speed.

The generating of a voltage by causing a conductor to move in a magnetic field requires the input of work into the system. In the wire recorder this work input is provided by the motor drive which pulls the wire through the playback pick-up. At Niagara and other hydroelectric plants the kinetic energy of falling water is converted to work which turns the rotors in the huge generators. Where waterfalls are uncommon the kinetic energy of steam is converted to work in a steam turbine. This work turns the rotor of the generator, which is a coil that moves in a magnetic field.

Increasing use of these electromagnetic principles has created a great demand for good magnetic steels. Steels having very little hysteresis but high electrical resistivity are needed for applications where the flux level must vary. Steels having both high coercive force and high residual flux density are needed for permanent magnet applications.

Flange machining time cut 70 pct.



SETUP of tapered cast iron pulley hub flange in air operated chuck of Fastermatic. Equipment machines tapered face, bores and threads 250 pieces in eight hours.

Cast iron pulley hub flanges are machined in large quantities at the Melrose Park Works of International Harvester Co. These flanges having a tapered face were formerly machined in turret lathe setups at a rate of 75 per 8-hr shift and required two machines and two operators.

The job is now done on a single No. 1F Fastermatic, having a double-tooled turret, at the rate of 250 pieces in 8 hours. It requires only one operator and only half the former space thus effecting a marked cost reduction. As shown in the accompanying illustration, the work is clamped in an air operated chuck.

In the initial operation, carbide tools on the cross slide rough the tapered face. End tools, also carbide, rough bore the cored hole. Second cuts then finish the face and hole, after which chasers of high speed steel produce a three-start thread in the hole to complete the machine work. Tool blocks are cam operated where plunge cuts were previously made. Better finish especially important on the tapered face is obtained despite the much higher production rate.

Consider a good INCENTIVE SYSTEM



By Frank C. Mattis, Jr.
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The Schaible Co.
Cincinnati

The right incentive plan offers a higher rate of production, permits an increase in take home pay and cuts unit manufacturing cost. Properly developed and administered, an incentive plan will definitely stimulate production. It can bring about orderly operation and create new thinking in the minds of management and labor. And it may lead to operating efficiencies by bringing some ideas from the thinking to the doing stage—actions which would never normally be taken under a day-work or non-financial incentive method.

Financial incentive wage plans fit in well as a partial solution to the inflationary spiral. Greater productivity is the actual solution, but to obtain greater production, management must provide a plan which will create in its employees a desire to produce. Nothing has yet been found to create this desire like a financial incentive.

The benefits of an incentive wage plan do not come easy. Probably foremost is the need for an understanding between management and workers. An incentive plan is a mutual tool. The benefits derived from it must reward both management and workers equally. Both parties must keep in mind that the wage incentive plan is actually an agreement between management and employees resulting in additional pay for output over and above normal production.

Once the purpose of the proposed incentive wage plan is understood by both employees and management, the base for a sound program is established.

Where an industrial engineering department exists, management should see that it gets all the

cooperation possible. To ease the load on the industrial engineering department—or the lone industrial engineer—an outside consulting firm might be retained on a "call-in" basis.

All incentive plans are similar in that they must reward the worker for performance that exceeds an established norm or standard on an assigned task. In doing this the plan must conform to the rules shown under "Fundamentals" (see box).

The incentive plan must embrace the following principles: (1) There must be a guaranteed base rate for all employees for actual hours worked. (2) There must be a guarantee that labor standards will not be changed no matter how high employee earnings rise, except for a change in job conditions. These job conditions involve such changes as methods, product design, tools, equipment, materials, quality requirements or service. A change in any of these conditions requires a restudy of the job and the establishment of a new standard. (3) Employees must be paid in direct proportion to their increase in perform-

If your productivity is on the decline, or not rising as it should be . . . if unit costs are increasing as workers get more take home pay . . . consider installing a financial incentive wage plan. Here are the fundamentals . . .

ance over standard; each 1 pct increase in performance over 100 pct giving the worker a 1 pct increase in pay. (4) Work standards established must include all necessary allowances: Required personal time, fatigue, timekeeping, etc. (5) Work standards must be uniform and consistent so that pay performance will remain constant at the same level of work performance no matter what product is being manufactured. (6) Workers must be protected against delays beyond their control. The base rate should be paid in cases of delay where non-standard work is required of the operator. Such delays as machine breakdown, delays on material, etc., should be paid at the hourly base rate. (7) Work standards should be established on an individual basis whenever possible; by groups in cases of interdependent operations. (8) All work standards should be established on the basis of time studied data. (9) Pay performance should be calculated on a daily basis. Finally, pay performance should be calculated on good pieces only.

Explain things fully to everybody

An incentive plan based on the above principles will have definite advantages (see box).

Generally there are certain routine steps that must be taken before the actual installation of the plan. These are: (1) Departmental survey with check studies to determine number and types of operations. (2) Analysis of studies to determine present level of production. (3) Prepare schedule of procedures covering installation of plan. (4) Establish specific procedures with regard to: Explanation of incentive plan, methods of pay calculation, time study procedure, etc. (5) Call in worker representatives and thoroughly explain in detail the plan and procedure. Obtain their approval and cooperation. This approach not only gains worker good-will but also eliminates future difficulties and (6) train presently employed time study men as well as additional men that may be required. Consider the possibility of selecting and training men to represent workers. If worker time study men are to be trained, make it clear that the establishment of work standards is a management function. The worker time study man enters the picture only when it is necessary to further explain or check a standard which may be in dispute.

Time study is a vital part of any wage incentive plan; the important role this section plays cannot be stressed too much. The technical aspects of time study and the need for accuracy in time studies is generally accepted. It can be understood then why great care must be taken in select-

FUNDAMENTALS

Of a good incentive plan

Define the job.
Measure normal performance.
Pay fairly for exceeding normal.
Make plan understandable.

PRINCIPLES

A successful plan contains these

Guarantee base rate.
Standards must not be changed unless job conditions change.
Pay must be directly proportional to worker performance over standard.
Standards must include personal time allowances, etc.
Standards must be uniform.
Protect against delays beyond worker control.
Set up on individual basis where possible.
Base work standards on time studies.
Calculate pay performance on daily basis.
Calculate performance on good pieces only.

ADVANTAGES

Of a good plan, well set up

It is easily understood.
Measure of performance time is absolute.
All work can be combined into a single performance figure.
Control is simpler.
Crew sizes are controlled, an oversize crew cuts earnings.

TAKE THESE STEPS

Before installing an incentive plan

Check number and types of operations.
Determine present production level.
Set up procedures for overall plan and details.
Get worker cooperation.
Train time study men.
Standardize work methods, tools and equipment.
Get sequence sheets in order.
Put the labor relations house in order.
Base rates must be in line on area basis.
Bring all phases of management into the picture.

ing men for the time study section. The men selected will eventually become the diplomats of management. They must be capable of handling many trying situations the results of which must be favorable. In addition to possessing a high degree of technical and administrative ability, the trainee must possess certain specific traits of character and must be capable of learning. Mannerisms and personality must be of the type generally accepted by both management and worker.

Time study men must command respect from the plant manager, foreman, and all men in supervision. Certainly if these men do not rate the respect of superiors, the worker will not look upon them with respect.

Must sell himself

The time study man must know his job and prove it by his actions. He must continually sell himself to the worker and supervision. He must realize that there is actually more to the human engineering side of time study than there is to the technical side. Failure of the time study man or management to recognize the importance of the human factor will lead to the eventual collapse of the incentive plan. To eliminate this possibility workers must have a thorough working knowledge of the plan. If this is done, good human behavior toward the plan is almost assured.

It is imperative that each section supervisor thoroughly understand the importance of his job in making the incentive plan a success. Supervisors should have a working knowledge of the incentive plan, time study procedure, and the company's policies with regard to the handling of disputes. The supervisor must be "in the know" for he is the man who represents both the worker and management. Furthermore the supervisor should be capable of associating worker efficiency on standards with the resulting labor costs that reflect his ability as a supervisor.

At this stage of the installation the right technique has accomplished unification of purpose, the type of plan has been agreed upon, the procedure has been established and explained, and the time study staff has been trained.

Good labor relations prerequisite

There are, however, several other very important factors that must be questioned and corrected before the plan is put into effect: (1) Have work methods, tooling and equipment been analyzed and standardized? Work standards, regardless of the accuracy of time studies, are only as good as the degree of methods standardization applied. (2) Are sequence sheets in order, have they been issued on each operation and are the operations being performed as indicated? This is a must if work standards are going to be properly identified and used to full advantage by production control for machine loading, and by the cost department for determining standard

and actual cost. (3) Is the labor relations house in order? If it isn't, the incentive plan had better be shelved until it is. There is no surer or faster way to get an incentive plan off on the wrong foot than to attempt to install it in the face of a dark labor relations picture. (4) Are the existing base rates in line with base rates of like industries in the area? If they are not, it would be better to consider a job evaluation plan first instead of an incentive plan. Base rates must be in line if management is not to be plagued with inequities which are certain to develop. A job evaluation plan is time consuming but when one realizes that through it lots of future troubles can be averted, the time required is well spent.

Also of great concern are the other phases of management that indirectly affect the success of an incentive plan. Good practices with regard to product engineering, production planning and scheduling, delivery of materials, material and inventory control, payroll control, etc., must be maintained, for they are the factor that can knock the props out from under an otherwise sound incentive plan installation if their shortcomings are not corrected.

Employees doubts must be removed

Assuming that sufficient care has been given to the correction of the above mentioned factors, time studies are in order and the plan can be placed in effect. Management will still find it wise to be cautious, to make certain that work standards are established by sound work measurement techniques. Time study men must know their jobs for they must maintain good labor relations. Because the industrial engineering department administers the incentive plan and therefore indirectly controls the employees earnings, more often than not, personnel in the time study section are subject to much criticism and suspicion. It is absolutely necessary that any doubts in the minds of employees be quickly removed through a straightforward factual approach to all problems that may arise. All disputes with regard to work standards, methods, incentive pay, etc., must be dealt with and equitably settled if possible before they reach the grievance stage.

In order to further assure a successful installation, several points are worth stressing: (1) All phases of management have to be considered in the installation of a good incentive plan because the plan affects and is affected by so many activities. These phases of management must have a complete understanding of the incentive plan if it is to be successful. (2) Every effort should be made to guard against bad faith developing between management and employees; wage incentives have been misunderstood for years. (3) The plan must be properly administered through a strong industrial engineering department. This department needs the cooperation of all phases of management, from foreman to general manager of the company.

Faster line, better control—

Transfer Equipment Stresses Flexibility, CUTS COST

By J. E. Snowberger
Master Mechanic
Willys-Overland Motors, Inc.
Toledo, Ohio

Production of cylinder heads for the new Hurricane six-cylinder F-head engine at Willys-Overland is performed on a new line installed to provide high production with minimum unit cost and minimum labor. On one section of the line, automatic transfer equipment receives cylinder heads machined top and bottom, then presses in valve guides, gages press fit, stamps part numbers, drills, reams, counterbores, taps, spotfaces, chamfers, inspects machining operations and turns out completed heads for the engine assembly line.

Setup of this separate, compactly arranged department has resulted in production of 50 heads per hr at 75 pct efficiency with only three men to complete machining operations. Comparable operations performed on another conventional line of general purpose equipment require 10 men. Production rate is less than half that of the transfer line and quality control is substantially more difficult because of the human error involved.

The line is particularly interesting since an assembly operation, the insertion of six valve guides, is performed by a Colonial multiple ram transfer press electrically interconnected with machining operations. With the exception of valve seat grinding, all of the machining operations are completed on the relatively short production line shown in Fig. 1. Machines are arranged in an "L" shape to fit the plant layout. After leaving the Footburt unit shown in right foreground of Fig. 1, the heads are rolled to the

Automatic transfer equipment permits production of 50 cylinder heads per hr at 75 pct efficiency. Most machining is done on relatively short production line. Multiple ram transfer press, electrically coordinated with machining operations, inserts six valves guides in cylinder heads. Line is set up to handle heads of three different compression ratios. Mechanical inspections prevent damage to machines and fixtures, cut rejects and provide quality control on finished heads.

right on conveyers to the valve seat grinder, seat tester, washer and water tester.

First machine in the line is a 15-station Footburt with 155 spindles. The first two operations include the spotfacing of two pads and the drilling of 35 holes, two of which are reamed for use as "work holes" for locating the head casting on all subsequent operations. Operations performed at following stations include additional drilling, reaming, counterboring, spotfacing, and chamfering. At station 4 the head is tumbled 90° to stand it on edge, at the same time dumping most of the chips.

Automatic inspections are made by the machine at Station 7, where the six spark plug holes are gaged; at station 10, where all holes to be tapped on another machine are checked to see that they have been drilled (not for size); and at station 13, where valve throat spotfaces and valve spring seats are checked for depth. Following finish line reaming of the six valve guide holes on the 15-station Footburt, a manual inspection of the valve guide hole size is made on about one head in ten. Allowed tolerance is plus or minus .0005 in.

The second machine in the automatic transfer line is a Colonial multiple ram assembly

press, Fig. 2, which presses in valve guides six at a time. Heads are picked up at the loading station and pulled into the second station by the transfer bar. The Colonial is electrically synchronized with the Footburt so that its operation including loading is completely automatic. Diamond tipped locating pins enter the previously drilled and reamed "work holes" at each end of the casting.

Six rotary brushes advance into the valve guide holes, cleaning them and applying a light film of No. 10 engine oil. Simultaneously, the last three digits of the part number corresponding to the compression ratio are stamped on the head. The entire line is set up to handle heads of three different compression ratios, the only alteration required being the stamp which is designed for ready interchangeability. Usually, heads are run in "batches" of the same compression ratio.

Gravity feed hopper used

After brushing and stamping, the head moves to the assembly station where locating pins again engage the part. Six valve guides are picked up by the rams from a gravity feed hopper of 60-guide capacity and as they advance are pressed into the casting, Fig. 3. Maximum capacity of the machine is about 420 guides per hr. The guides are held to a tolerance of plus or minus .0005 in. on the OD and are .0005 in. to .0025 in. larger than the guide hole for press fitting.

Typical of the mechanical inspections performed on the head line is the automatic gaging provided on the Colonial machine by a panel of red and green indicator lights in front of the operator. Lights are actuated by a series of Vickers pressure switches and show quality of the fit within the tolerance of plus or minus 50 psi. If any one of the guides requires less than 350 psi behind the ram, a corresponding red light shows that either the valve guide is too small or that one of the Footburt reamers at station 14 is cutting oversize. Guides which require between 350 and 450 psi for insertion are normal and a green light appears for each one. In the case of a guide which requires more than 450 psi behind the ram no lights appear and the inspection system stops the Colonial machine and the entire transfer line ahead. These mechanical inspections prevent damage to machines and fixtures, reduce parts rejection and provide positive quality control.

Chips blown out dry

Although the Colonial machine could be tied in directly with the next unit, a 9-station Footburt, it has been found advisable to break the line at this point for blowing out chips and for manual inspection. Blowout of dry chips is readily accomplished here, whereas blowout after tapping with cutting oil failed to dislodge



FIG. 1—Fifteen-station Footburt machine left, background, automatically loads Colonial assembly press. Heads are inspected, blown out and transferred manually to 9-station Footburt machine seen in the foreground.



FIG. 2—Colonial multiple ram assembly press, located between 15- and 9-station Footburts inserts valve guides in cylinder heads. Unit is electrically synchronized with production line and automatically inspects press fit.

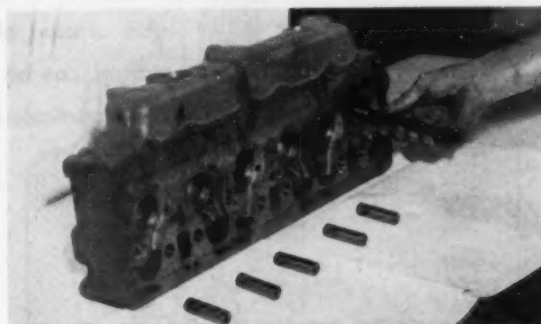


FIG. 3—In assembly press valve guides are picked up six at a time from gravity feed hopper by hydraulic rams and inserted in drilled and reamed holes in casting.

some chips inside the intake manifold. Only one man is required for inspection and blowout of the head, and he also controls the cycling of all machines in the transfer line.

After completion of the inspection and blow-out, heads are manually loaded flat into the 9-station, 42-spindle Footburt where valve guide bushings and valve throats are finished reamed, valve seats chamfered and 25 holes are tapped.

The heads are next visually inspected, assembled with pilot pins and rolled by hand to a six-spindle Waterbury-Hall valve seat grinder along the Logan gravity roller conveyor.

It takes anything—

New bearing made of any material,



By R. M. Higgins
Engineer
Allis-Chalmers Mfg. Co.
Milwaukee

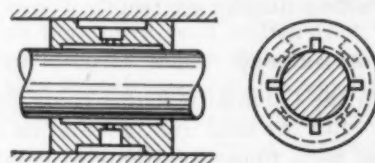
A fluid piston type bearing for pumps doesn't need to be made of bearing materials, nor lubricated with oil or grease. But horsepower requirements are high. Its primary use is on pumps that have to be lubricated by the liquid being pumped. It makes no difference if the liquid is hot, corrosive, and of low viscosity. Bearing materials can be selected to combat heat and corrosion regardless of whether it would work in ordinary bearings. Running clearances are not tight. A reasonable amount of foreign particles, or metal-to-metal contact during startup, can be tolerated. In fact, bearing surface doesn't even have to be particularly smooth.

Several extremely unusual advantages are exhibited by new fluid piston pump bearings. They can be lubricated by the fluid being pumped, though it may have no lubricating qualities in the usual sense and may be hot and corrosive. They can be made of materials which would not be suitable for conventional bearings. Metal-to-metal contact for short periods can be tolerated. Foreign particles which score the bearing don't necessarily affect its operation. In fact, the bearing surface doesn't have to be particularly smooth.

Leak-tight specifications for pumping of corrosive liquids, including liquid metals, practically dictate that the bearing operate in the fluid being pumped. This means that the bearings are required to be lubricated with fluids which are low in viscosity, having very poor lubricating properties when measured by standards of normal bearing requirements. Frequently the choice of

materials which may be selected for the bearings is limited, due to the corrosive properties of the fluid and other considerations, to materials that would offer poor bearing qualities even if lubricated with oil.

As an answer to these limitations, Allis-Chalmers has developed a fluid piston type of



HOW the fluid piston bearing works. Liquid flows from supply area into piston chamber, out between edges of chamber and pump shaft. Pressure floats shaft with large running clearance.

lubricated with any fluid

bearing. This bearing is a refinement of special balance pistons which have been used for years to absorb thrust load on turbines. The Allis-Chalmers designs include the application of the hydraulic piston principle for radial bearings as well as for double-acting thrust bearings.

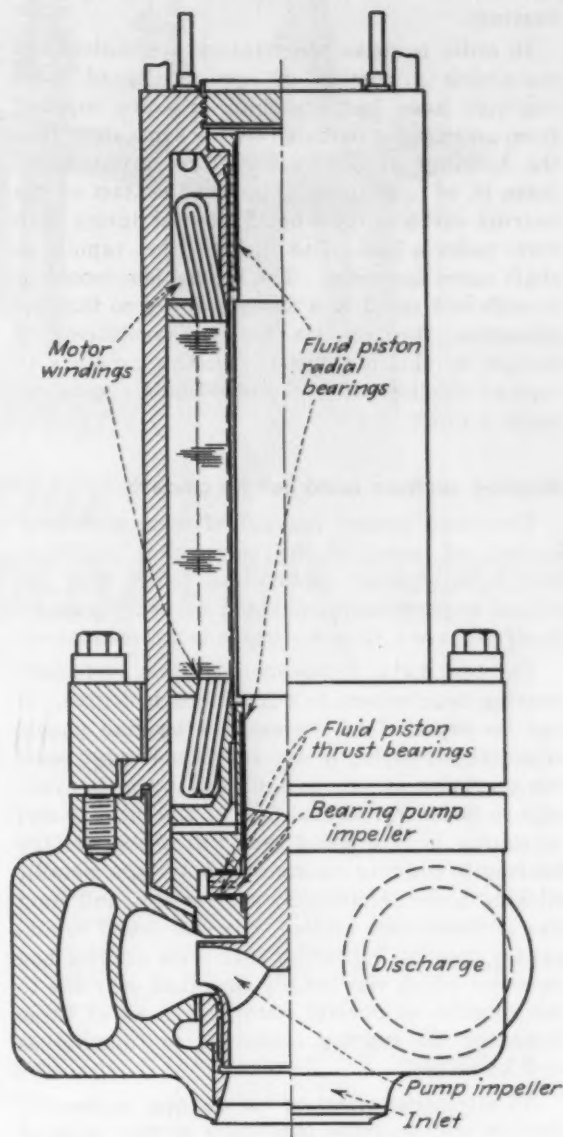
The radial bearing consists essentially of three or more pockets or pistons spaced around the circumference of the shaft. Usually four such pistons are used, with each piston covering a little less than 90° of arc, leaving some space between adjacent pistons. Each piston is a shallow rectangular box with an open end facing the shaft. Normal bearing clearance is provided between the journal and box edges or piston lips. From a pressurized source, fluid flows into each box through an orifice in the box, and out between the lips and shaft. When the journal is centered in the bearing, about half of the pressure drop takes place through the orifice, and the other half of the pressure drop occurs as the fluid passes out of the open end.

Journal shift controlled by load

If the shaft should be displaced towards one piston, the leakage area out of the piston between the journal and the bearing would be reduced. This would result in less flow through its orifice and, hence, less pressure drop and greater piston pressure. The same displacement would produce reverse results in the piston on the opposite side: Greater leakage area, greater flow, greater orifice drop, and hence less piston pressure. This difference of pressure in opposite pistons sets up a restoring force which tends to overcome the displacement of the journal, absorbing the load causing the journal to shift.

The bearings can be so designed that the shift from the centered position is very close to being directly proportional to the imposed load. Unless this load is close to full bearing capacity, the running clearance will be a large percentage of the centered clearance. This demonstrates a fundamental difference from sleeve type bearings, which obtain their capacity from a very thin film requiring very close running clearance and almost perfect alignment. This also explains the ability of the fluid piston bearing to tolerate a considerable amount of foreign particles which would disable any other type of bearing in a short time.

Fluid piston type thrust bearings have also



HERMETICALLY sealed centrifugal pump, shown in cross-section, uses fluid piston bearings to support shaft and resist thrust. Thrust collar also acts as impeller to furnish pressure to bearings. Motor is sealed unit. Pump is leakproof.

been developed. The principle of operation is identical with that of the radial bearings. In the case of thrust bearings, the pistons face both sides of a rotating collar. They also are supplied through an orifice, with the fluid leaving the piston through the leakage area between the piston lips and the face of the rotating collar. Ad-

"The fluid piston bearing has made it possible to use all kinds of metals . . ."

vantages of the fluid piston type bearings apply equally well to both the thrust and radial type bearings.

In order to make the rotating mechanism self sustaining a number of applications of these bearings have had the fluid pressure supplied from an impeller mounted on the same shaft that the bearings support. With this arrangement there is, of course, metal-to-metal contact of the bearing surfaces for a brief interval during each start under a load. But it diminishes rapidly as shaft speed increases. The mechanism comes up to sufficient speed in a second or two so that acceleration through six to ten revolutions is enough to obtain sufficient bearing pressure to support the imposed load and terminate metal-to-metal contact.

Bearing surface need not be smooth

This brief contact has caused some scuffing or scoring of some of the permissible materials tested for special applications. But this has caused no permanent trouble in the bearing action itself because a smooth surface is not mandatory.

The bearing is independent of this customary bearing requirement to a considerable degree. It can be expected in the event a bearing should seize or gall during a stop it will not upset bearing operation as long as sufficient torque is available to twist the journal free of the bearing and accelerate it to a speed that will pressurize the bearing to running clearance. In tests, a metallic clicking noise immediately after a stop and start has at times been noticed, but was found to disappear rapidly, indicating that some scuffing had occurred which was readily smoothed over due to the rotation of normal running. In all of these instances the bearing continued to function as well as before.

An attractive aspect of the bearing is the convenient and accurate indication of the centered and running clearance of the bearing and the bearing load. These can be continuously mea-

sured while the bearing is in actual operation. This is accomplished by reading bourdon gages showing the ratio of piston pressure to supply pressure for each bearing. The readings are converted to clearance and load, on charts of calculations for each bearing. This feature has been named the hydraulic micrometer.

Sensitivity of hydraulic mike readings obtained on tests indicate that their accuracy competes with and may actually excel actual physical micrometer sensitivity. This knowledge has permitted tests to continue with full confidence of bearing action. For instance, when scuffing, due to starts and stops or foreign particles, was noted by noise indication, no difficult dismantling for inspection was necessary. The hydraulic mike displayed very accurately the lack of overall wear, and demonstrated that the tests could continue without fear of bearing trouble. This eliminated many time-consuming periodic inspections which are often very difficult to make due to the hazards and precautions necessary in handling parts contaminated with liquid metals.

The fluid piston bearing has made it possible to use metals acceptable for all requirements including corrosion which would not be acceptable for either sleeve or ball bearings. Many of the bearings were Type 347 stainless steel, and all were of metal combinations having a relatively poor compatibility rating.

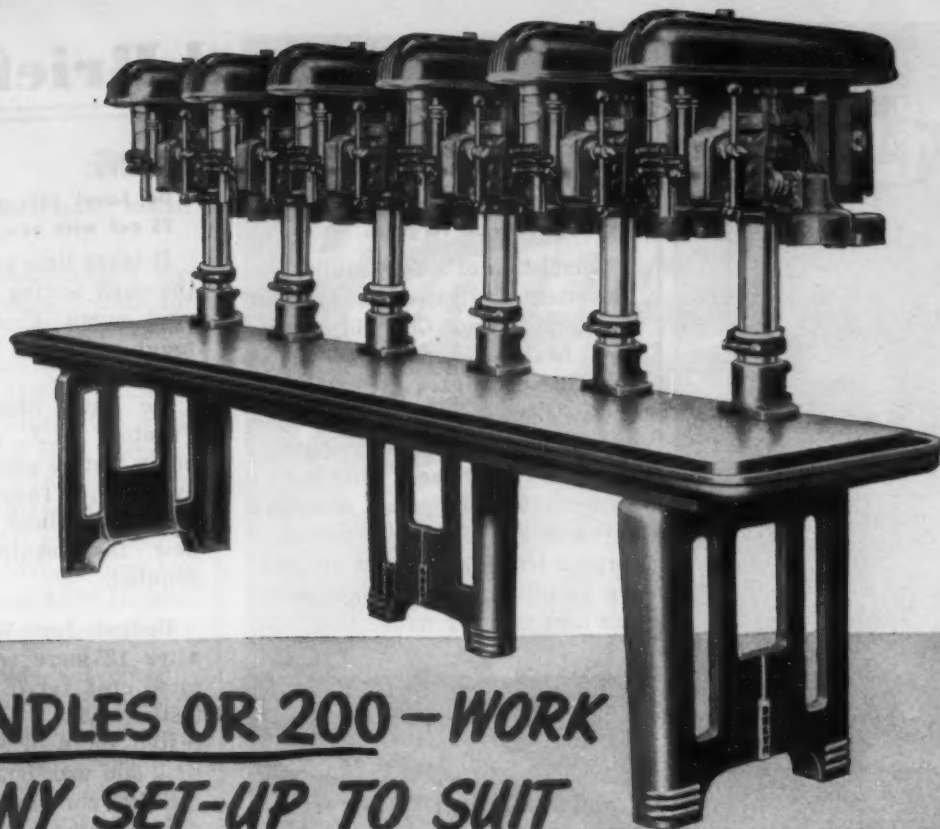
No fretting type corrosion

The fluid piston type bearing circumvents the penalty of low viscosity bearing fluids. It practically eliminates the existence of and minimizes the harmful effects of fretting corrosion. And it permits the use of metals selected for corrosion resistance which are not suitable for other types of bearings. The penalty of this bearing is a somewhat higher overall horsepower requirement for pressurizing the bearing. This is especially high in units requiring operation at reduced speeds with the bearings supplied by the rotation of the shaft they support. However, this penalty has been reduced to a minimum. It appears well worth the price in exchange for the ruggedness and dependability of the bearings. This is especially true in the case of pumping of corrosive fluids but the fluid piston type bearing also has many possibilities for hermetically sealed applications in other fields as well.

NEW BOOKS

"MAPI Accounting Manual." Revised edition of the accounting manual published by Machinery & Allied Products Institute. A comprehensive reference work for finance and accounting officers of the metalworking industries. Machinery & Allied Products Institute, 120 South La Salle St., Chicago 3. \$15.00.

"Executive Compensation and the Stabilization Rules," by V. Henry Rothschild. Stenographic brief of an address given before the California Personnel Management Assn. and the Personnel Section of the Western Management Assn. California Personnel Management Assn., 2180 Milvia St., Berkeley 4, Calif. \$1.00. 11 p.




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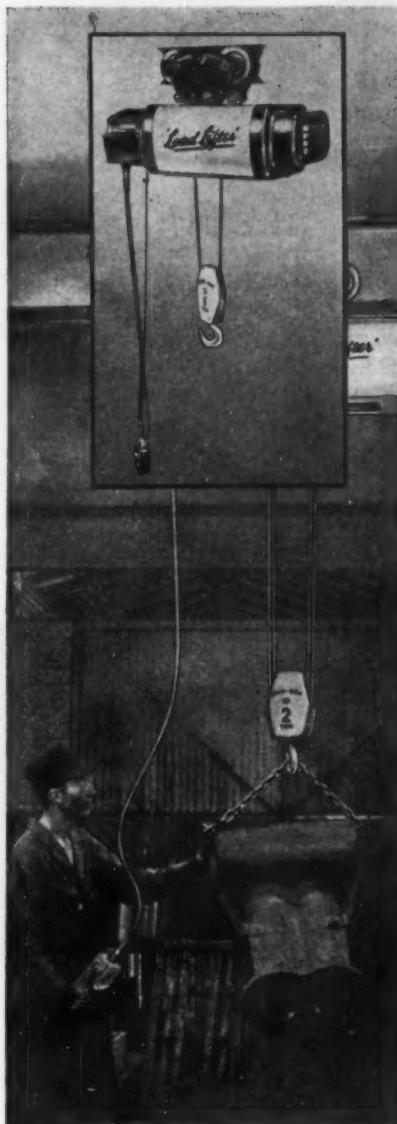
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MANNING, MAXWELL & MOORE, INC.
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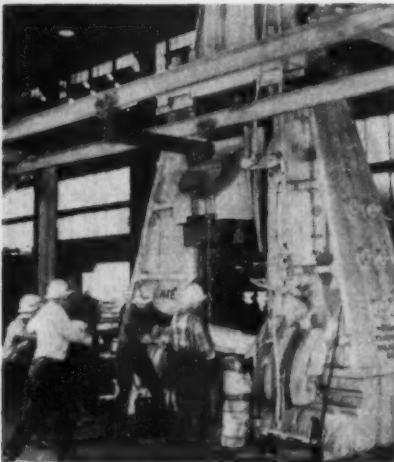
Builders of "Shaw-Box" Cranes, "Budgit" and "Load Lifter" Hoists and other lifting specialties. Makers of "Ashcroft" Gauges, "Hancock" Valves, "Consolidated" Safety and Relief Valves, "American" Industrial Instruments.

BIG HAMMER:

Kropp Forge expands to handle aircraft, titanium forgings.

Completion of a \$4½ million improvement and expansion program at Kropp Forge Co. will provide new facilities for all phases of forging operation.

New equipment recently installed and now in operation includes a 40,000-lb drop forge hammer, a 4000-ton forging press, additional furnaces for heating material to forging temperature, new die sinking facilities, handling equipment, and heat treating units.



NEW DROP FORGE hammer installed as part of Kropp Forge Co.'s \$4½ million expansion program is a 40,000 lb job. Foundation goes 40 ft below floor.

Aircraft Parts—Many important aircraft parts, such as landing gear forgings, structural members and jet engine parts will be produced on the new equipment.

The big hammer is one of the largest of its kind and represents a total weight of close to 1 million lb. The foundation extends 40 ft beneath the floor surface and is composed of 535 cu yards of concrete, 6 ft of oak cushioning and 700,000 lb of steel.

Closer Tolerances—The need for larger, closer tolerance forgings in aircraft parts, many of which are being produced from very highly alloyed materials, difficult to forge, necessitated installation of the heavier equipment.

TESTING:

De Laval cuts pump testing costs 75 pct with new test stations.

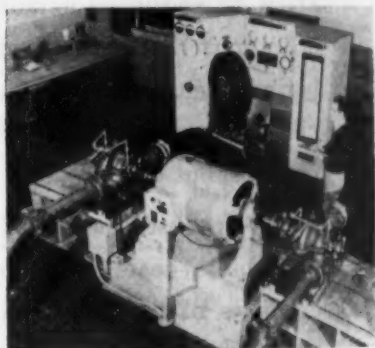
It takes time and money to do a thorough testing job on a centrifugal pump. Customer specs are tough and there are a lot of variables.

De Laval Steam Turbine Co., Trenton, N. J., recently took its pump testing procedures in for an overhaul. They stripped down and streamlined methods; added new fast equipment where it counted.

Budget Joy—What they found after 12 more service operations totaled up a fat 75 pct reduction in testing costs. And those savings rested on a firm foundation of time and man hours saved.

Chief contributor to that big savings are De Laval's new deluxe pump testing stands. The stands are engineered to give a complete reproduction of performance for pumps of all sizes and ratings.

Few Tools Needed—The test engineer doesn't need a variety of



SAVINGS of 75 pct in man hours showed up when De Laval Steam Turbine, Trenton, N. J., looked over cost figures for 1 yr's operation of its new consolidated test stands. Test engineer sets simulated conditions from control desk, gets quick, and final, readings from many instruments.

tools. Permanent installations consist of a double-ended dynamometer mounted on an automatic lift between two pre-aligned pump bedplates. Pumps of one rotation are coupled to one end of the dynamometer shaft while pumps of opposite rotation are coupled to the other end.

METAL SHOW:

Prizes for metallographic exhibit entries announced.

The seventh Metallographic Exhibit of the American Society for Metals, will be held at the National Metal Congress and Exposition in Philadelphia, Pa., Oct. 20 to 24.

A large area within the Philadelphia Convention Hall, scene of the "Metal Show," has been reserved so that displays of the Metallographic Exhibit can be shown to best advantage. Work which has appeared in previous ASM Metallographic exhibits is not acceptable.

Wide Open Field—Ten classifications of micros are designated for the contest, including tool steels and tool alloys; stainless and heat resisting steels; other steels and irons; aluminum, magnesium, beryllium, titanium and their alloys; copper, zinc, lead, nickel and their alloys; metals and alloys not otherwise classified; series showing transitions or changes during processing; surface phenomena; results by unconventional techniques (other than electron micrographs); slags, oxides and inclusions.

There will also be a competition for undergraduate students at the 1952 Metallographic Exhibit in Philadelphia. First prize, a bronze medal and \$25 cash; honorable mention, a ribbon and \$10 cash.

Other Prizes—A committee of judges appointed by the Metal Congress management, will award a first prize (blue ribbon) to the best entry in each classification. Honorable mention will be awarded to those closely approaching these winners.

A grand prize, certificate and \$100 cash, will be presented to the exhibitor whose entry was best in the show. The grand prize entry becomes the property of the American Society for Metals for preservation and display in the Society's national headquarters. Up to the minute coverage of the show will be presented in forthcoming issues of THE IRON AGE.

Turn Page

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This T-J Cutter at work on a connecting-rod die block for a board drop hammer. A cutter of right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these machines.

Specify **T-J**

FOR MORE WORK BETWEEN GRINDS!

In die and forge shops everywhere . . . T-J Die Sinking Milling Cutters are today's top favorites . . . because they're "tops" in performance!

You can raise the feed . . . they're *extra sturdy* for cutting tough die steels! Designed for speed, accuracy and long life . . . T-J Cutters hold a sharp edge longer on job after job . . . less breakage! Made from an extremely high grade steel . . . properly machined . . . scientifically heat-treated, accurately ground. Wide range of styles and sizes . . . *right* to increase the output of your machines and *reduce costs*! Send for new catalog 150. The Tomkins-Johnson Co., Jackson, Mich.

T-J FOR TOUGH JOBS

TOMKINS-JOHNSON

DIE SINKING MILLING CUTTERS

NONE BETTER... America's First and Safest

HERC-ALLOY

SLING CHAINS

STRENGTH—Size for size, no other sling chain offers a greater tensile strength. HERC-ALLOY will not crystallize—never requires annealing.

SAFETY—HERC-ALLOY Sling Chains are made to your specifications. Every new sling carries a written guarantee, is registered and tested before shipping. This registration serial number is carried at the top link.

● Serial number permanently affixed near top link for positive identification.



● Identify HERC-ALLOY by the patented inswell side weld with the extra swell of metal on the inside of the link.



EFFICIENCY—Lighter, stronger HERC-ALLOY Sling Chains feature the exclusive short, narrow link design which holds firmer, less tendency to kink, less gouging. Workmen handle HERC-ALLOY with less effort.

PREFERENCE—Men who buy and use sling chains are influenced only by facts learned through experience. HERC-ALLOY Sling Chain preference has been built up over the years, not just by what we say, but by how HERC-ALLOY performs on the job.

Write for Data Book No. 3 which contains much useful manufacturing and application information on HERC-ALLOY Sling Chains.

COLUMBUS McKINNON CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corp.)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

District Offices: New York • Chicago • Cleveland

Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., and Johannesburg, South Africa.

—Technical Briefs—

METAL FINISHING:

New C57S alloy takes brilliant finish . . . May be used for auto trim.

An aluminum alloy that will take an unusually brilliant Alumilite finish has been developed by Aluminum Co. of America.

Alcoa C57S, as the alloy has been designated, holds great promise in the field of automobile trim, Alcoa's engineers believe. With an Alumilite coating it could be used as an attractive, economical and long-lasting replacement for chromium plating and stainless steel.

Many Colors—The alloy promises a new versatility to automobile trim. Besides taking a clear Alumilite finish of high brilliance, this alloy offers the added attraction of colored Alumilite finishes in many shades.

Although this is the first public announcement of Alcoa C57S, it has been used extensively in the field of giftware and refrigerator trim. From experience in these applications, a good working knowledge of the alloy has been developed.

Alumilite-treated C57S approaches high-purity aluminum in the transparency, metallic luster, and sheen of its finish, while affording substantially higher mechanical properties. It has excellent forming characteristics.

BONDING:

Eutectic enters organic metallic bonding field with Ciba Co.

An exclusive agreement has been reached by the ChemoTec Div. of Eutectic Welding Alloys Corp. and the Ciba Co. Inc., to exploit processes developed from new materials that perform unique functions in bonding metals.

Titanium, magnesium, aluminum, and all the metals and alloys commonly in use, together with glass, wood, porcelain, plastic, may be joined to each other or metal may be joined to glass, fabric to metal, or glass to wood by the new processes.

Turn to Page 166

Big loads
going up—

SO

RADIOGRAPHY
checks the
crane wheel

YOU'RE dealing with big stresses and strains when you jockey multi-ton loads of metal around your plant. Every part of the crane must be ready for its job—with an extra margin.

That is why this crane wheel was checked by radiography. It was the one way to prove whether gas pockets or other internal defects might exist to cause a hazard.

Foundries working with all kinds of metals and alloys are finding it increasingly important to radiograph their castings. Then they know only quality

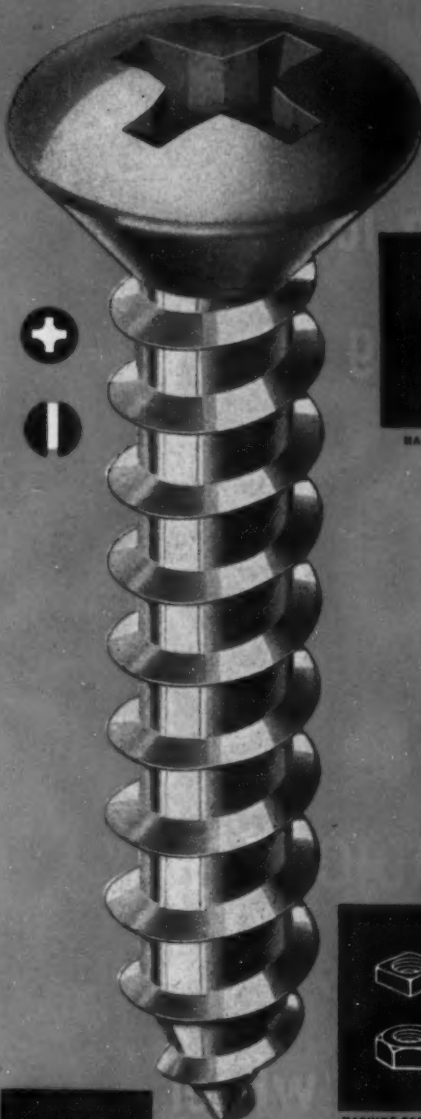
products are released. Also in planning long production runs, radiography of pilot castings often indicates ways to improve methods and increase yield.


See your x-ray dealer. He'll gladly show you how radiography can increase your production and improve quality. Also send for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division
Rochester 4, N. Y.


Radiography...
another important function of photography

Kodak
TRADE-MARK






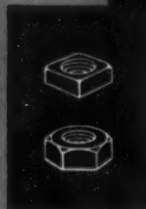
MACHINE SCREW




STOVE BOLT




SPECIAL WIRE FORM



MACHINE SCREW NUTS



AUTOMATIC SCREW
MACHINE PRODUCT



TWIN-FAST SCREW

BLAKE & JOHNSON

For tapping screws of highest quality... call Blake & Johnson. Type A-B-C available with slotted or Phillips heads, plain or slotted hexagon. Case-hardened, plain or plated finish. Special designs engineered to your order. Blake & Johnson is headquarters for industrial fastenings to meet standard or specialized needs: Twin-Fast® wood screws, machine screws, stove bolts, special headed products, machine screw nuts, rivets, chaplets, wire forms, automatic screw machine products... in steel, brass, or other alloy metals.

Write for new catalog >

Fastenings

WATERVILLE 48 CONNECTICUT

—Technical Briefs—

MINE BLASTING:

Bureau of Mines report lists permissible explosives, devices.

A list of explosives permissible for use in coal mines under the safety standards of the Bureau of Mines, United States Dept. of Interior, and a list of permissible blasting devices approved by the Bureau prior to Dec. 31, 1951, have been made public.

The present list of permissible explosives supersedes all previous lists. Explosives transferred to the inactive list and those which have been admitted to the active list since Dec. 31, 1945, are shown. Class designation according to the volume of poisonous gases, the weight of 1 1/4 x 8-in. cartridges, the velocity of detonation, and the manufacturer of each brand are included.

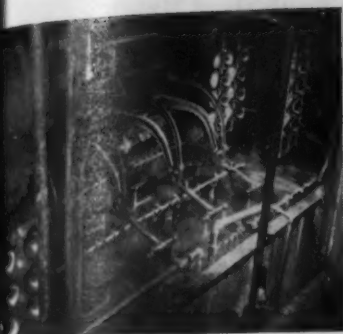
Conditions—In the list of approved blasting devices, the permissible conditions for charging each shell and the maximum weight of the heater element are given. The list of blasting devices is identical with that released on Dec. 31, 1945.

The testing of explosives and blasting devices is part of the Bureau's program of promoting safety in the mineral industry. Those declared "permissible" have been tested and approved by the Bureau as safe for use in coal mines when used as prescribed by the Bureau.

Less Black Powder—A decrease in the use of the highly dangerous black blasting powder and an increase in the use of permissible explosives. Black powder was the first explosive used in mining. Many mines, especially the smaller ones, still use it in spite of its dangers the Bureau reports. Black powder is dangerous because it can readily ignite explosive gas and coal dust.

It was pointed out that the duration of the flame of black blasting powder is 1500 to 3500 times that of permissible explosives. Tests also show longer flame.

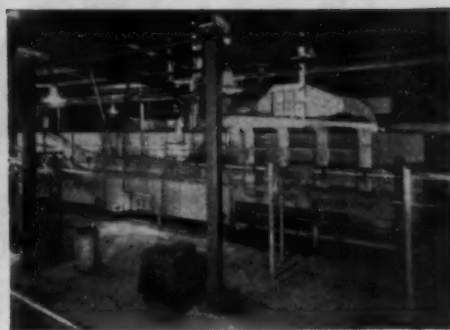
(Turn to page 170)



2 Fewer rejects—A parts manufacturer who uses WYANDOTTE F.S.* for electrocleaning of steel parts prior to electroplating, reported fewer rejects due to incomplete cleaning—calls F.S. "thorough and economical to use." You can profit, too, with WYANDOTTE products!



3 Wide line of cleaners includes W.L.G.,* a product with a balanced formula of exceptional detergency, long life, versatility (cleans copper, brass, bronze as well as ferrous metals). W.L.G. is also used for heavy soak-tank, barrel, and rotary-washer cleaning, low-pressure spray washing.



4 Power washing—WYANDOTTE Metal Cleaner No. 38 puts added power in power washing machines . . . has high detergency, is used for cleaning ferrous and non-ferrous metals. Versatile, economical (through long solution life). Ask your helpful WYANDOTTE service representative to demonstrate.

Wyandotte's amazing cleaning product sales!

Wyandotte Chemicals is the leader—the world's largest manufacturer of specialized cleaning products for business and industry.

And Wyandotte sales climbed 45% in the past 2 years . . . are still going up, UP, UP!

Why? Because more and more industries have learned that *with the leader, Wyandotte, they get advantages they could find nowhere else*: a complete line of high-quality products for every cleaning need; skilled technical service, and research most capable of solving *new* cleaning problems; dependable supply of raw materials from *our own* salt and coal mines and limestone quarries; more than half a century of the broadest possible cleaning experience . . . *all of which can save you money, give you better cleaning!*

May we help you? Write Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 12, California.

*REG. U.S. PAT. OFF.



Wyandotte CHEMICALS

Helpful service representatives in 138 cities in the United States and Canada



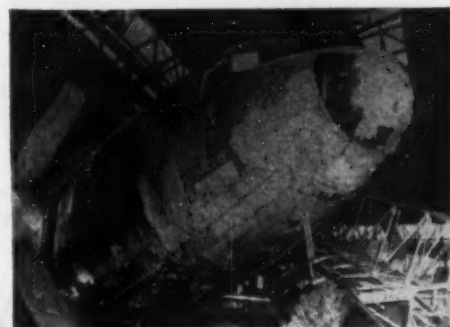
8 For steam and hot-water pressure cleaning, WYANDOTTE supplies Fairtex No. 1 for *medium*, and Special H for *heavy* deposits of oil and grease; Altrex*, a mild, noncorrosive product for light oils and grease. Complete line, too, for maintenance cleaning.



9 Floor absorbent—Zorball is a really different product, almost mandatory wherever water, oil, grease, chemicals accumulate on floor. Doesn't break down, blow or track . . . remains skidproof when saturated . . . can be used again after drying. Prevents accidents. Saves dollars.



5 Railroad cleaning—Products for every job include free-rinsing, solvent emulsion cleaner, WYANDOTTE-20. One of many WYANDOTTE railroad products, No. 20 does a uniformly fast, thorough job of flushing off heavy grease, oils. The WYANDOTTE line includes vat cleaners, interior and exterior car cleaners, waxes.



6 Aircraft—WYANDOTTE line includes paint strippers (Sprazee), fuel-tank desalants, carbon removers, degreasers; brightening, polishing and corrosion treatments; conveyor power washing, vapor steam cleaning, exterior washing, and electrocleaners; aluminum cleaners and deoxidizers for spot-weld preparation.

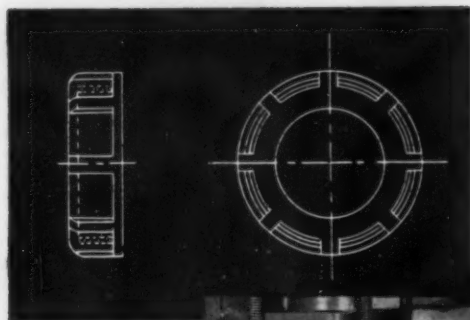


World's largest manufacturer of specialized cleaning products for business and industry

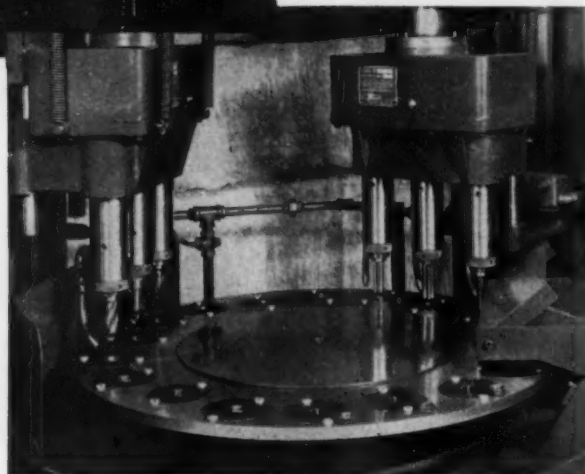
CLEVELAND tapping machines

lead
screw

2919 Pieces per Hour!

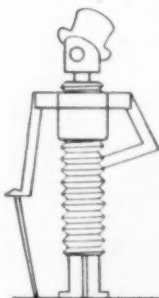


CLEVELAND Special Combination Drilling and Tapping Machine equipped with a drilling unit and a Model E-2 CLEVELAND Lead Screw Controlled Tapping Machine mounted over an automatic six-station index table. (Below)



Here is an unbeatable combination for a manufacturer who must save valuable working time and cut production costs... a CLEVELAND combination drilling and tapping machine with three spindle multiple heads on each unit for core drilling or reaming and tapping three parts at one time. This particular CLEVELAND machine turns out 2919 1/2" bushings per hour at 100% efficiency. Your own tapping problem may not involve the production of bushings but CLEVELAND engineers have the know-how and engineering experience to design and build for your plant tapping machines which will cut costs and increase production. They invite your inquiries without obligation on your part. Write today for your copy of Cleveland Catalog R-14.

Mr. Lead Screw says:



... Check with Cleveland First if you need to perform any of these operations: Core Drilling... Reaming... Tapping... Threading... Chamfering. Cleveland engineers can show you how to effect economies in these operations. Cleveland Tappers have ALL the features you want.



When you write for your catalog ask us to include a copy of the CLEVELAND PRODUCTION TAPPING GUIDE. Full of valuable data for engineers and operators.

THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.
CANTON 6, OHIO



Technical Briefs

ENGINEERS:

Manpower shortage subject of Chicago meeting this week.

National attention was focused on the current engineering manpower shortage problem this week at Chicago, when a statement dealing with such important manpower problems as Universal Military Training and Universal Military Service, Expanded R.O.T.C. Proposals, Unified Reserve Legislation, Selective Service and Industrial Utilization was presented by Carey H. Brown, Chairman of the Engineering Manpower Commission of Engineers Joint Council.

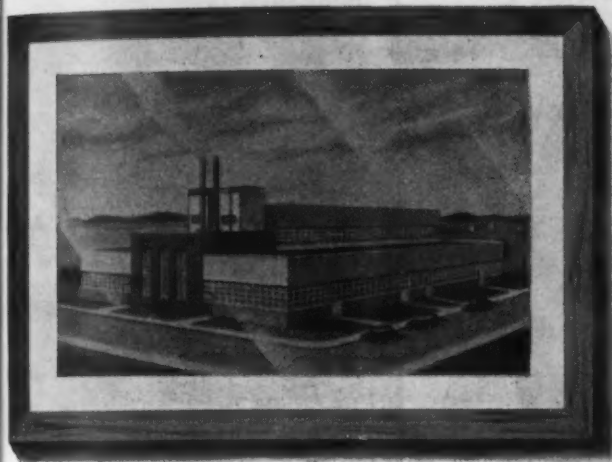
Over 1000 representatives of industry, the government, and the military, concerned with shortage of engineers heard the views of the Engineering Manpower Commission during this conference in the Grand Ballroom of the Conrad Hilton Hotel, which was conducted by General Chairman O. W. Eshbach, President, Western Society of Engineers, member EMC, and Dean of Northwestern Technological Institute, Northwestern University.

Manual Helps Cut Tool, Die Costs

A new 64-p. illustrated manual devoted to effective "Tool and Die Salvage Welding" procedures, has been prepared by Eutectic Welding Alloys Corp., Flushing, New York. Copies may be obtained free of charge by writing directly to Eutectic at 172nd St. and Northern Blvd., Flushing 58, New York.

Turn Page





Whatever your fuel picture, there's a B&O coal to fit it!

• In the Baltimore & Ohio area lies a treasure-land of Bituminous—an almost inexhaustible source of low-cost heat and energy. Here are found Bituminous coals of all varieties—for power, for coking, for steam, for space heating.

B&O coals are excellent for generating steam in utility and industrial power plants, for steel mills, malleable iron plants, gas plants, lime and brick kilns, cement and glass plants, and potteries.

Whatever your "burning need," Industrial or Domestic, there's a B&O coal to meet it—and we are ready to help you find the best for your purpose. Just ask our man!

**BITUMINOUS COALS
FOR EVERY PURPOSE**



BALTIMORE & OHIO RAILROAD

Constantly doing things—better!



THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP—1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

**BACKLASH
FRICTION
WEAR and
CROSS-PULL**
are eliminated
LUBRICATION IS
NOT REQUIRED!

**THE THOMAS PRINCIPLE GUARANTEES
PERFECT BALANCE UNDER ALL
CONDITIONS OF MISALIGNMENT.**

• • •
NO MAINTENANCE PROBLEMS.

• • •
**ALL PARTS ARE
SOLIDLY BOLTED TOGETHER.**



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

—Technical Briefs—

HUMIDITY CONTROL:

Metalworking industry leads the way in wringing air dry.

Best part of this year's record production of industrial humidity control units—estimated 1952 volume may top \$15 million—is going to the nation's metalworking plants.

Authority for this statement is Winfield B. Heinz, president of Dryomatic Corp., manufacturer of automatic, electric dehumidifiers. The metalworking industry, Mr. Heinz says, is leading the way in elimination of storage and production problems by wringing air dry.

Many Applications—One metal products company in Richmond, Va., for instance, uses a Dryomatic unit to prevent aluminum foil from turning "milky." A screw company in Rhode Island uses the dehumidifier to prevent rusting of wire spools; a sheetmetal company in New Brunswick stops formation of rust on sheetmetals and in the tool cribs.

Automatic—Many of the units are completely automatic. There are no buckets to empty or chemicals to change. Their range of operation is from -40°F to +100°F. This makes these units suitable for all operations requiring humidity control.

The biggest model manufactured effectively controls humidity increases up to 25,000 cu ft of enclosed space. The compact unit measures 45 x 19 x 16 in. The machine is a 3-channel continuous absorption type dehumidifier, and comes equipped with a humidistat. The dessicant is a combination of silica gel, and activated alumina, which is automatically reactivated after saturation.

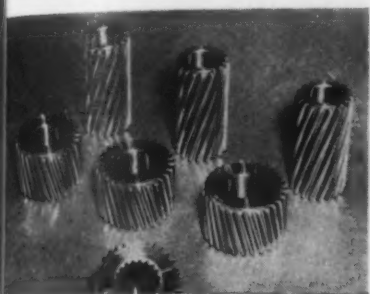
Develop New Furnace Refractory

A new magnesite-chrome refractory, electrically melted and cast for use in metallurgical processes, promises to extend the life of open-hearth and other furnaces. Laboratory and field tests on Corhart 104, developed by Corhart Refractories Co., Inc., Louisville, Ky., indicate the materials is especially resistant to slag erosion and spalling.

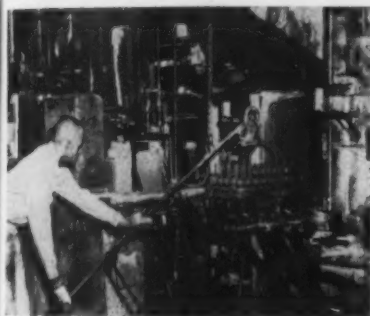
CASE HARDENING:

Rotary hearth furnace used to give light cyanide case.

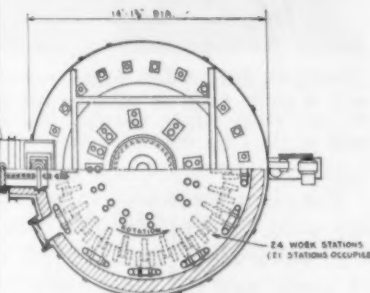
Pinions and gears for Buick automatic transmissions are being case hardened in a rotary hearth furnace equipped with radiant tubes and a recirculating fan. Enriched RX prepared atmosphere



PINIONS and gears for Buick automatic transmission are case hardened in cyanide.



CHARGING rotary hearth furnace. Enriched RX atmosphere gas is used.



TOP VIEW of furnace shows location of work stations in circle around radiant tubes.

gas provides active cyaniding medium in the unit developed by Surface Combustion Corp.

The gears, of SAE 4620, are heated to 1550°F in the 12 ft diam rotary furnace and quenched in nitrate bath at 410°F. Rated production capacity is about 612 lb per hr net of pinions and gears.

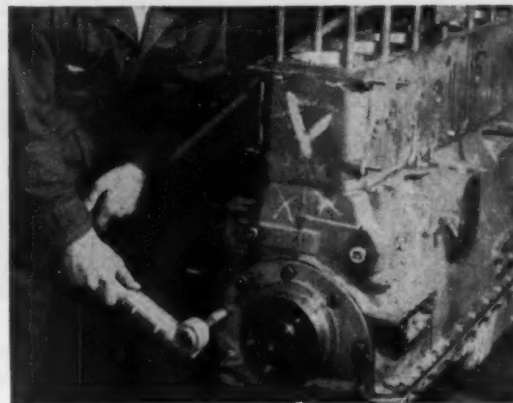
Turn Page

Buckeye "B" Series grinder removing burrs from flywheel housing for bus engine.



"...because Buckeye Tools stand up better"

Running in cap screws on a truck engine takes less time with this Buckeye "B" Series wrench. Buckeye "C" Series right angle wrenches are also used for this type of work.



A West Coast manufacturer of truck and bus engines buys portable air tools solely on the basis of performance—and uses Buckeye wrenches, grinders and drills in production and assembly work. In placing a recent order for Buckeye drills, the plant engineer said, "We use a lot of air tools here and have found over a period of years that Buckeye tools give us less trouble and stand up better."

Buying air tools on the basis of performance alone is simply good business—particularly when you can test Buckeye tools in your own plant, on your job, without obligation. Write today for your copy of our Air Tools catalog—and start now to save time and money with Buckeye tools.

Buckeye Tools
CORPORATION
DIVISION 11, DAYTON 1, OHIO

Portable Air
and Electric Tools
for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario



This bolt
solved a **SPECIAL**
problem



This Brake Pedal Bolt was designed and made to do a special job better, faster and more economically. It is typical of what you can expect when you use our experience to solve your fastener problems.

We'd like to discuss all of the advantages we can offer you . . . in detail. Why not call us in.

● To help simplify specifying and ordering fasteners, you need the latest catalog information. You can get it with our No. 51 catalog. Write for your copy today.



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BOLT COMPANY

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Sales Offices in Principal Cities

PRODUCERS OF CIRCLE B PRODUCTS — BOLTS • NUTS • RIVETS AND SPECIAL FASTENERS

—Technical Briefs—

WELDING:

Stainless on passenger cars easily butt welded in repair yard.

Making straight-butt welds in 18-8 stainless steel, 0.019 in. thick, is routine practice in the repair shops of Pullman Co. in Chicago. This work is being done by using Heliarc welding on stainless steel fluted side members of passenger cars which are frequently damaged in service.

After the damaged stainless strips are loosened from the car side, ends are cut off square. A new section is butted and held in place by a hinged copper back-up and hold down fixture that conforms to the shape of the fluting. Simple screw clamps force the fluted strip against the back-up.

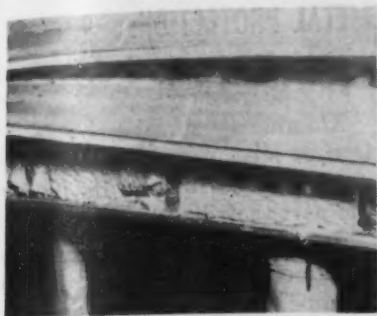


STRAIGHT BUTT WELD in thin stainless strip is easily made on passenger cars at Pullman repair yards, Chicago. Strip is held in place by shop made jig.

Tungsten Electrode—In making the weld, an 0.040 in. diam tungsten electrode is used. Current is 11 amps. and the argon shielding gas flows at the rate of 15 cu ft per hr. Added rod is Oxweld No. 28, 1/16 in. diam.

No Spatter — This method of welding makes it possible to produce a minimum build-up with no spatter. A quick light-grinding followed by buffing produces a finished joint in which it is difficult to detect the weld.

Prior to the successful welding of this thin fluted material it was



COMPLETED WELD prior to finishing operation. Tungsten electrode is used in welding. After grinding weld is difficult to detect, fits smoothly.



WHEELED CART holds ac power supply, cooling water for torch and cylinder of argon.

necessary to replace a strip for the entire length of the car side. This was costly and to ship these 70-ft lengths required two flat cars. Short lengths are now used.

The welding unit used for the job is compact and portable. The wheeled unit contains transformer, gas supply, and cooling water for the torch.

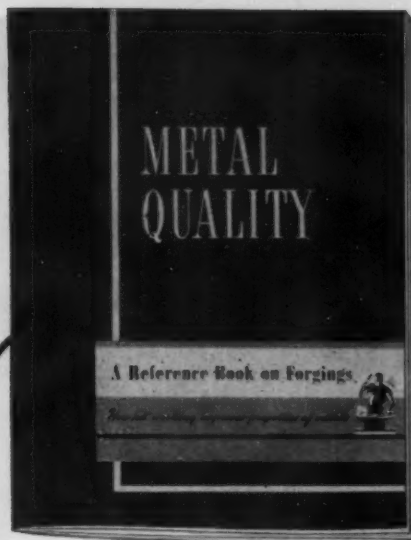
Richer Ore Found in Michigan

Government assistance is no longer needed in operating Allouez mine No. 3 in Michigan as a result of uncovering a higher grade ore.

Allouez No. 3 is one of four mines belonging to Calumet & Hecla Consolidated Copper Co. which were covered by an over-the-ceiling price agreement or guarantee made last January between the mining firm and Defense Materials Procurement Agency.

The 29.7¢ per lb guarantee, suspended May 1, will not be resumed DMPA says.

Turn Page



Engineering, production and economic advantages obtainable with forgings are presented in this Reference Book on forgings. Write for a copy.

FORGINGS ARE UNUSUALLY EFFECTIVE FOR SOLVING PROBLEM PART PROBLEMS

A problem part problem, however complex, often ceases to be a problem once all the aspects of the part are checked with the unrivaled economic and mechanical advantages of closed die forgings and the closed die forging process for producing parts. Whatever the nature of problems that make a problem part, consult a forging engineer to determine the extent to which forgings can help you solve them.

DROP FORGING ASSOCIATION

605 HANNA BLDG. • CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metal", 1949 Edition.

Name
Position
Company
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COMPLETE SELECTION

for every
requirement



Use ARCOS Low Hydrogen Electrodes

As a pioneer in the development of Low Hydrogen Electrodes, Arcos offers you the most complete selection available today. Whether your job involves welding mild steel, high strength-low alloy steels, sulfur-bearing free machining steels, chrome-moly steels, or low nickel alloy steels . . . you can be sure of the results you want.

Since 1942 Arcos has been turning out Low Hydrogen Electrodes under Stainless "quality controls". That's your assurance of consistently sound, high-strength welds on every job. It means there's nothing experimental about Arcos Low Hydrogen Electrodes. They've already been "tested and approved" on armor welding as well as commercial applications. ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Pa.

WELD WITH

ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes



Technical Briefs

METAL PROTECTION:

Aluminum sprayed on iron, steel parts slows corrosion.

Aluminum sprayed on most iron or steel part exposed to heat corrosion will add to the life of the part treated.

Some typical parts treated by this method, Metallizing, include cyanide pots, salt pots, magnesium and aluminum pouring pots, burner tips, hardening furnace parts and pyrometer tubes.

Sprayed and Sealed—Briefly the protection method, consists of spraying a coating of pure aluminum over the areas that will be affected by heat corrosion, applying a suitable seal over the coating to prevent oxidation during the heat treatment that follows and then heat treating the piece for a short period.

A compound coating is formed which is composed of three layers.

- (a) Next to and fused into the steel is a solid solution of iron and aluminum.
- (b) next comes a layer of iron-aluminum alloy ($FeAl_3$) together with a slight excess of free aluminum.
- (c) finally comes a thin coating of aluminum oxide.

Flakes Away—The outer layer flakes away after several hours of temperatures over $800^{\circ}C$. As long as the aluminum layer remains on the surface of the steel, "scaling" is impossible and it is only when aluminum coated steel is heated to $1000^{\circ}C$, that an accelerated rate of penetration of the aluminum into the steel reduces the percentage of aluminum in the coating sufficiently to allow oxidation to commence. The method can be used to advantage up to temperatures of $1000^{\circ}C$.

Sealers—There are a number of sealers which can be used, but the one which has given uniformly good results is silicate of soda, commonly known as water glass.

Bitumastic paint, a saturated solution of borax and water glass, have all been used effectively.

Main object of the sealer is to prevent oxidation of the aluminum while the diffusing layer is forming. Tests have shown that water glass is the best sealer. Generally speaking, aluminum coated parts should not be used in an atmosphere of much over 750°C although it will resist oxidation up to 900°C.

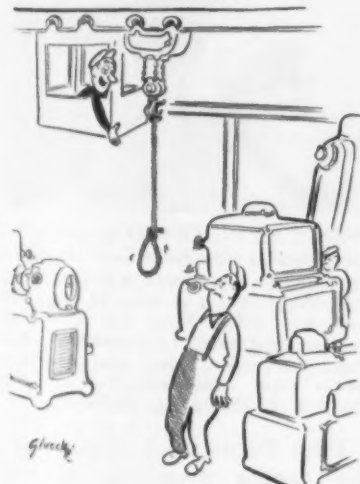
Crazed Effect—Most grades of cast iron grow under the influence of prolonged heating and as the aluminum oxide skin cannot grow at the same time, a crazed effect is obtained and oxidation proceeds along the lines where the aluminum oxide skin has fractured. An iron not subject to growth is advisable.

Surfaces impregnated with aluminum also resist the attack of gases extremely well and surfaces formed by spraying nickel bearing alloy with aluminum prevent sulfurizing. The method is specified for aircraft manifolds by the British Air Ministry.

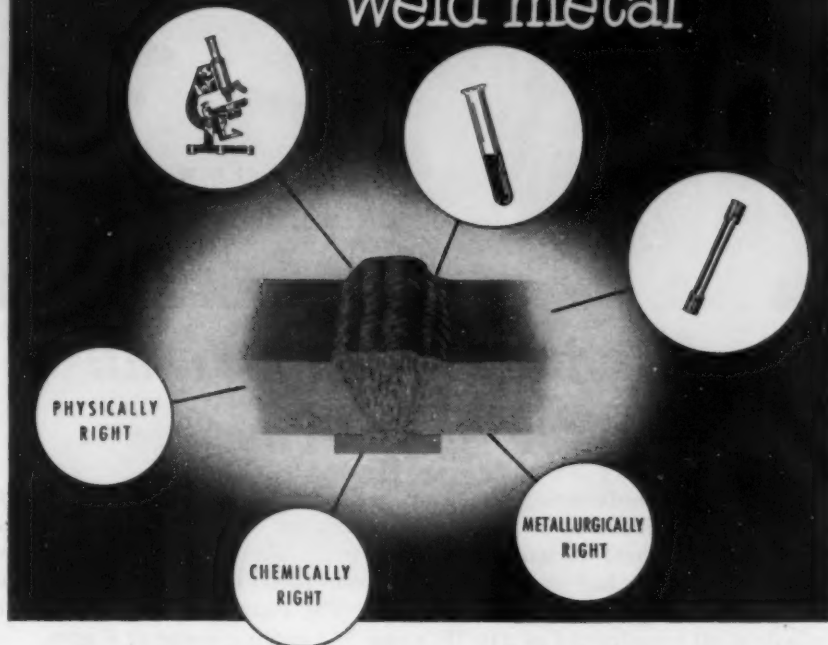
Sealer Needed—In the case of spraying airplane exhaust stacks and exhaust manifolds on gas engines or stoker tuyeres, and cast iron fire walls it has been found that it is unnecessary to use a sealer.

Airplane exhaust stacks are blasted, sprayed with 0.008 in. pure aluminum, 2SH, and then put in service. The heat from the exhaust will give the protecting effect without the necessity of using a sealer.

Turn Page



QUALITY weld metal



Use ARCOS "Quality Controlled" Stainless Electrodes

The production of top-flight welds largely depends upon the inherent qualities of the weld metal. That's why Arcos Stainless Electrodes must pass so many "quality controls" in manufacture. It's your protection for soundness, specific mechanical or corrosion resistant properties, or microstructures that can stand up to destructive service conditions.

Whatever your welding job, you'll find it pays to put your confidence in Arcos. Backed by long experience with fabricators' welding problems, and research in the behavior of various grades of electrodes in use and weld metal in service—you can trust Arcos Stainless Electrodes to deliver consistently dependable welding results. ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Pa.

WELD WITH

ARCOS

Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes





cool this quench oil tank for 1/3 the cost

At the K-D Manufacturing Company, a manufacturer of metal stampings, Platecoils were installed in an oil quench tank for only 1/3 the cost quoted by a standard heat exchanger manufacturer. Three hundred pounds of material per hour had to be quenched from 1600 °F. to 140 °F. with the quench oil being recirculated at 15 gpm. The Platecoils were specified to maintain oil temperature of 110 °F. using 75° cooling water at 6 gpm.

The efficiency of the Platecoils exceeded expectations, reducing the oil temperature to 85 °F. within 25 minutes. According to Mr. Madeira, Tool Room Foreman: *"Under extreme summer temperatures and the largest loads ever quenched, the installation maintained the desired quench temperatures."*

The reason Platecoils cost so much less is they have so much more effective heating or cooling area in a limited space. For instance, a 22" x 47" Platecoil gives the same heat transfer surface as 32 ft. of 1½" pipe which would require approximately 30" x 60" of space. Thus a Platecoil only half the size often provides a much greater BTU transfer per unit area. This means savings in initial cost, tank space and installation time.

Everywhere that Platecoils are used the story is always the same: They heat or cool faster, can be installed quicker at only a fraction of the cost of other methods. Write for Bulletin No. P73.

PLATECOILS gives you these ADVANTAGES

Cleaned and Repaired Without Dumping Tank Solution

Greater BTU Transfer Per Unit Area

Weights Only Half as Much as Pipe Coil

No Threaded Joints in Tank

Increased Tank Capacity

Fast, Easy Installation

Easy to Clean



—Technical Briefs—

POWER:

Alumina, dolomite additives to fuel oil cut maintenance.

Fewer interruptions in power generation, lowered maintenance costs, and improved power plant operation may be possible through the use of alumina or dolomite additives to fuel oil.

Heart of the problem is one which has long bothered boiler operators. Ash content of certain low grade oils, deposits on boiler heat transfer surfaces as a hard residue. It's not easy to get off with either high pressure air or water lancing. Frequent interruptions in operation are needed for thorough cleaning.

New Approach—In 1949, Babcock & Wilcox Co. engineers decided a modification of the fuel ash deposits might make them more readily removable.

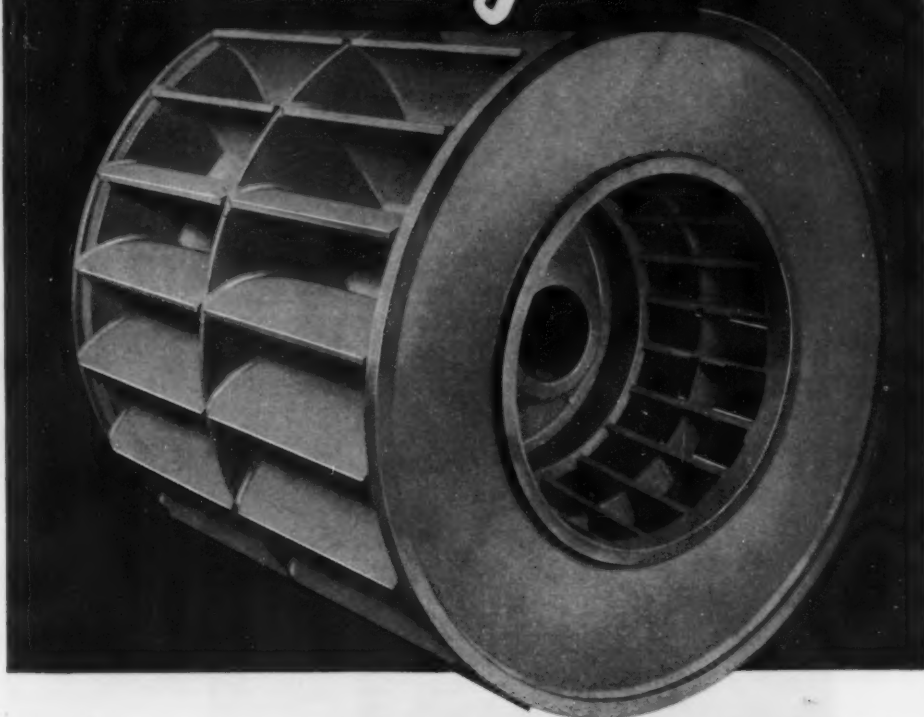
Superheater deposits were found to be characterized by low-melting constituents. Laboratory work was carried out on selected materials that, when mixed with the oil ash, would raise its melting point. Upon deposition on heating surface it would then be dry and thus more readily removable.



THERE'S AN EASIER WAY to remove hard tough residue from boiler heat transfer surfaces where low grade oils are burned. By adding alumina or dolomite to oil, Babcock and Wilcox found ash deposit was powdery and could be brushed off, inset, these test coils. Later, tried at Florida power plant under operating conditions, The B & W theory was confirmed.

Pilot Furnace—A pilot furnace for testing promising additives

use castings?



WELDMENTS CAN SAVE YOU MONEY!

Acme weldments are replacing castings for leading machinery and equipment manufacturers everywhere because they do a better job at lower cost. Experienced Acme engineers at work with Acme's complete fabrication facilities can give you these same advantages . . . Acme's new 24-page, illustrated booklet shows you why. *The Facts about Weldments and Castings* tells you what you should know about their relative strength, rigidity, vibration, design flexibility, and cost . . . facts to help you specify and save. And it's yours for the asking . .

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under simulated operating conditions was set up. Equipment consisted essentially of a small furnace and a series of three aircooled coils from which combustion product deposits were collected. Coils were placed at different levels in the stack.

Diesel fuel oil to which a synthetic ash was added was used to produce deposits similar to those obtained on commercial units.

Additives — Alumina, magnesium oxide and calcium oxide were found to be the most promising of the additives tested in producing a powdery deposit.

Field tests on a commercial unit under operating conditions were made at the Inglis station of the Florida Power Corp. This boiler, in operation since 1947, is normally removed from service twice each year for cleaning.

Results — Test results of both alumina and dolomite proved successful. Dolomite however was more economical at the Florida installation. Deposits in the superheater region were changed from a dense hard slag to a relatively soft ash and indicated that it should be possible to keep the unit on the line indefinitely if the furnace walls, screen tubes, and superheater tubes were lanced with air at 225 psi about once a week.

Using alumina in an amount equivalent to the quantity of ash in the oil, cost of additive has been approximately \$1.00 per hr or \$750 per mon.

From an ash standpoint, there is every indication that the unit can be kept clean for an indefinite period with the use of a 200 psi air lance every 5 to 7 days. Air jet discharge should be close to the ash that is being removed.

Babcock & Wilcox has applied for patent protection. Patents obtained will be licensed by the company to industry on a royalty-free basis. However, the company would appreciate hearing from users as to their experience with this development, particularly on boilers, so that such information can be correlated.

Turn Page

September 11, 1952

it's thriftier...

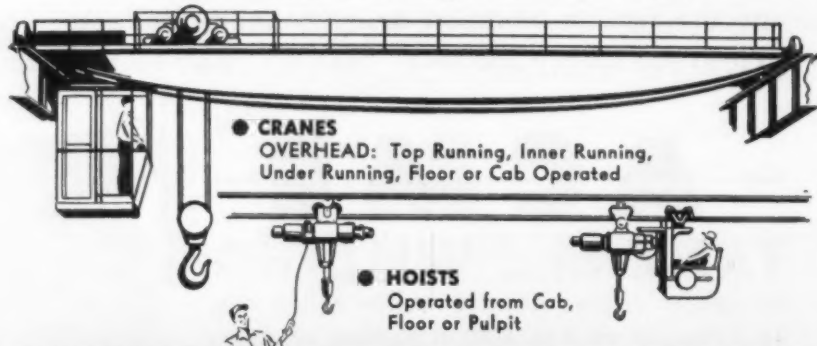
THROUGH THE AIR



HERE'S THE THRIFTY WAY to handle materials — with only two stops from start to finish! Pick up the load at the door with this Shepard Niles Crane, then deposit it where you want it. There's no further handling, no floor space wasted. Instead, you make room for more production and storage.

IT'S NOT ONLY LESS COSTLY, it's faster and easier when you handle it through the air. But what crane will suit your plant best? The Shepard Niles representative can give you this answer, based on a careful study of your plant's needs. Send for Bulletins 175 and 176 today — ask to have a representative call.

Specialists in loads through-the-air since 1903.



SHEPARD NILES
CRANE AND HOIST CORPORATION

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—Technical Briefs—

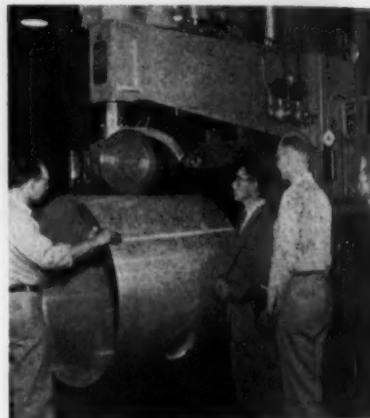
SEWING METAL:

Big seam welder at Northrup helps build Scorpion sting.

Getting the sting into a Scorpion F-89 takes a lot of doing. Machinery must be bigger and more powerful. A new giant Sciaky seam welder acquired by Northrup Aircraft, Inc., Hawthorne, Calif., helps get these planes into the air for the U. S. Air Force.

The machine towers 13 ft above the floor and will accommodate a longitudinal seam 60 in. long or "sew" a seam around a cylinder 5 ft in diam. Seams, which are leakproof under pressure, can be welded at the rate of 24 in. per min on either Alclad or steel.

Maximum pressure is 10,000 psi generated by an airline pressure of 80 psi. Gross weight of the machine is 33,000 lb. Welds may be made on Alclad materials up to 0.125 in. thick and on steels to 5/16 in.



SEAM WELDER installed at Hawthorne, Calif., plant of Northrup Aircraft, Inc., will help get Scorpion F-89's into the air faster for the U. S. Air Force.

Arms Interchange—Two ponderous arms on the machine may be interchanged as easily as closing or opening a door. One of the arms is designed for longitudinal welds and the other for circumferential welding. Top wheel of the welder may be turned to match either of the wheels attached to these arms. The arms are hung on huge trunnion hinges and swing either way as needed. The machine does roll-spot or continuous welding as desired.

Turn Page

THE ACTUAL IS LIMITED: THE POSSIBLE IS IMMENSE

NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1952

BUILDS STRONGER MORE RIGID MACHINE BASE ...cuts weight 36%, lowers cost 45%

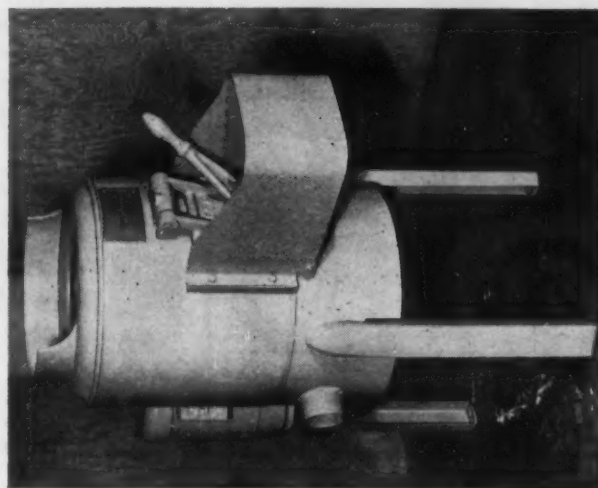
By **A. H. Hallenbeck**, Plant Manager
Gifford Wood Company, Hudson, New York

WELED design has been adopted on many of our machine components because of lower cost and better quality production with steel. As shown in the welded base (Fig. 2), lower weight with steel now saves on material cost as well as in transportation charges. Welded steel can be fabricated with simpler skills, helping to eliminate production bottlenecks in the shop. Components are pre-machined on light, fast machine tools prior to welding, saving time and cost of operating heavier shop equipment as was the case with cast construction.

Through welded steel, our shop now has better control of its work schedule. We are no longer dependent on outside sources for castings nor contend with storage and maintenance of pattern equipment.

Welded design makes it possible to meet price competition in our field that we were unable to do with the original cast designs. The product has a more modern appearance to improve selling appeal.

Fig. 3—Food processing machine for the Gifford Wood Company, Hudson, New York. Streamlined appearance is simple to maintain, easy to clean.



WELDED DESIGN ALWAYS SAVES STEEL AND LOWERS COST



Fig. 1—Original Construction—Base for processing machine. Weighed 67 pounds. Material Cost—\$15.05; Machining Cost—\$7.34. Total Cost \$22.39.

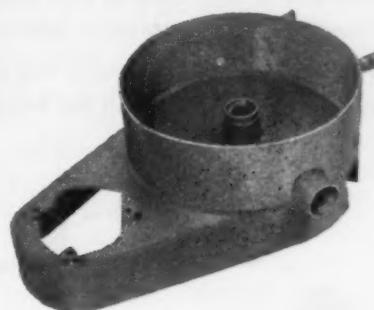


Fig. 2—Present Welded Steel Design—Stronger, more rigid. Weighs only 43 pounds. Material Cost \$2.50; Fabrication—\$9.77. Total Cost—\$12.27.

HERE'S HOW

Machine Design Sheets available on request. Designers and Engineers write on your letterhead to Dept. 511.

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

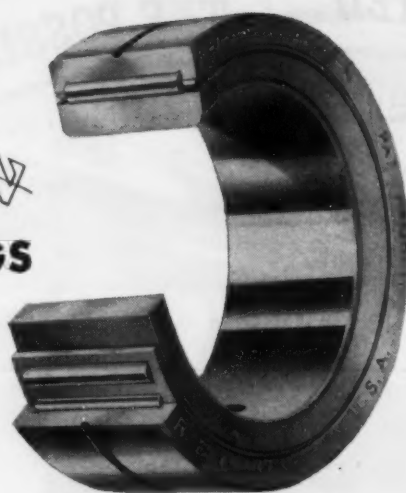
September 11, 1952

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RBC

PITCHLIGN

ROLLER BEARINGS

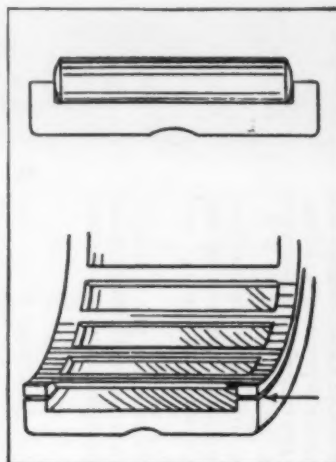


*...have
Integral Flanges*

Rollers are located axially by direct contact with the flanges which present a continuous surface to the ends of the rollers. As a result, it is impossible to have end thrust against the cage.

Integral flanges support the free-floating cage which does not ride the rollers, but acts only to align them at their pitch circle. Flanges serve also to retain lubricant.

PITCHLIGN is interchangeable with precision needle bearings. Get all the facts!



GET THE FACTS!

Write Today

Ask for Bulletin SF-366

ROLLER BEARING COMPANY OF AMERICA • TRENTON, N. J.

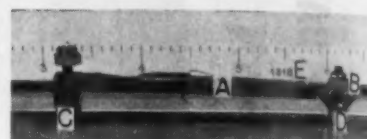
Technical Briefs

LIMIT LOAD GAGE:

NBS turns out simple testing device to test stress limits.

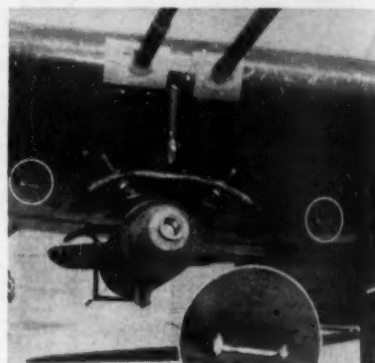
A limit load gage recently developed at the National Bureau of Standards provides a simple means for determining whether basic structural components of operational aircraft have been stressed beyond safe limits.

Developed for the Navy Bureau of Aeronautics, the gage indicates visually when wings or other structural elements have been subjected to loads equal to or greater than a predetermined load—beyond which permanent damage may occur.



Side view of limit load gage

MAJOR PARTS of NBS limit load gage are: A, arm; B, cam; C and D, gage points. Hardened steel arm tip E can be set above and overlapping the cam B by a predetermined distance equal to desired elongation. When exceeded, arm drops from cam to position shown.



GAGES WERE INSTALLED on underside of starboard wing of F8F Grumman Bearcat. Two tapped holes are needed for installation on units to be tested.

It's Simple—About 3 in overall, the gage consists of an arm, cam, and gage points. Simple in principle, the gage indicates overload when the arm, initially set above the cam in a cocked position, flips past the cam. Gage is mounted on a structural member by two holes drilled and tapped at desired location.

The gage is generally mounted on the tension surface of a beam

subjected to bending. Flight tested on piston and jet-type fighter aircraft, the gages were mounted at three positions on the wing. On the wing surface directly under some gages were placed wire resistance strain gages.

Reasonably Accurate—Following test flights of simulated dive bombing and strafing the recorded outputs of the strain gages were compared with the strain values provided by the limit load gages and found to agree within 10 percent.

Results indicate the limit load gage will also be useful when only the maximum strain is desired.

Customers Want Brighter Colors

Probably the most color-conscious auto producers are at Buick where intensive research on color trends goes on continuously.

Latest phenomenon discovered by Albert H. Belfie, Buick sales manager, is the rapid extent that black is losing its popularity in these days of brightly colored models.

With a special nod to conservative easterners, Belfie points out that "even in the East," there has been a marked decrease in black cars. At Buick, only 9.2 pct of the current model runs are black compared with 13.3 pct a year ago.

At the Framingham, Mass., plant, where proper Bostonians probably obtain their cars, the percentage of black cars was still 21.5 pct, although substantially lower than last year's 29.3 pct of black cars.

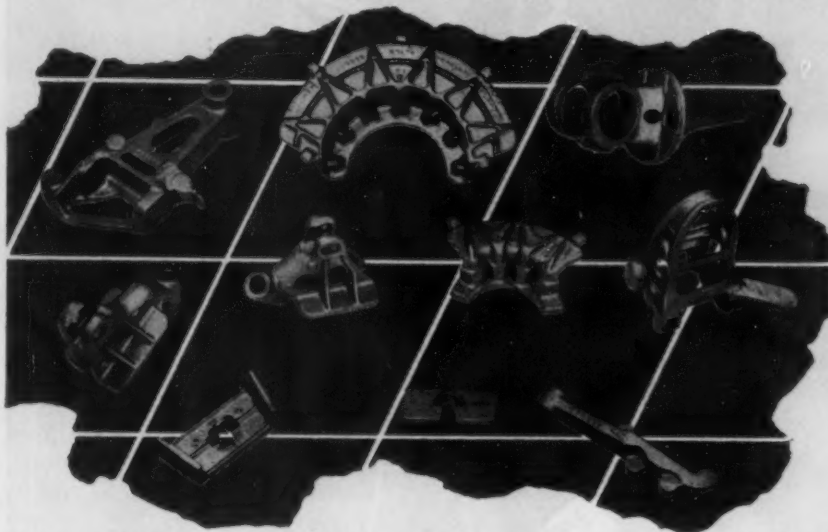
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UNITCAST

Daily rides the **AIRPLANES**

(Aircraft castings used directly or as an accessory attachment)



UNITCASTINGS

..ENGINEERED TO "TAKE IT"

Each of the above castings is the result of cooperative designs embodying the best-known foundry techniques available to assure the production of HIGH STRENGTH, MINIMUM WEIGHT, DEFECT-FREE castings. Each part is either percentage checked or 100% checked by radiographic and magnetic particle inspection.

Unitcast HAS met and WILL continue to meet the demands of industry, producing pre-determined TOP QUALITY castings, as shipped, and with personal follow-up to check machinability, fixture fit, assembly fit, etc., in YOUR PLANT.

Your successes reflect on our books. May we offer our services to challenge any knotty problem your product may present to the castings industry.

UNITCAST

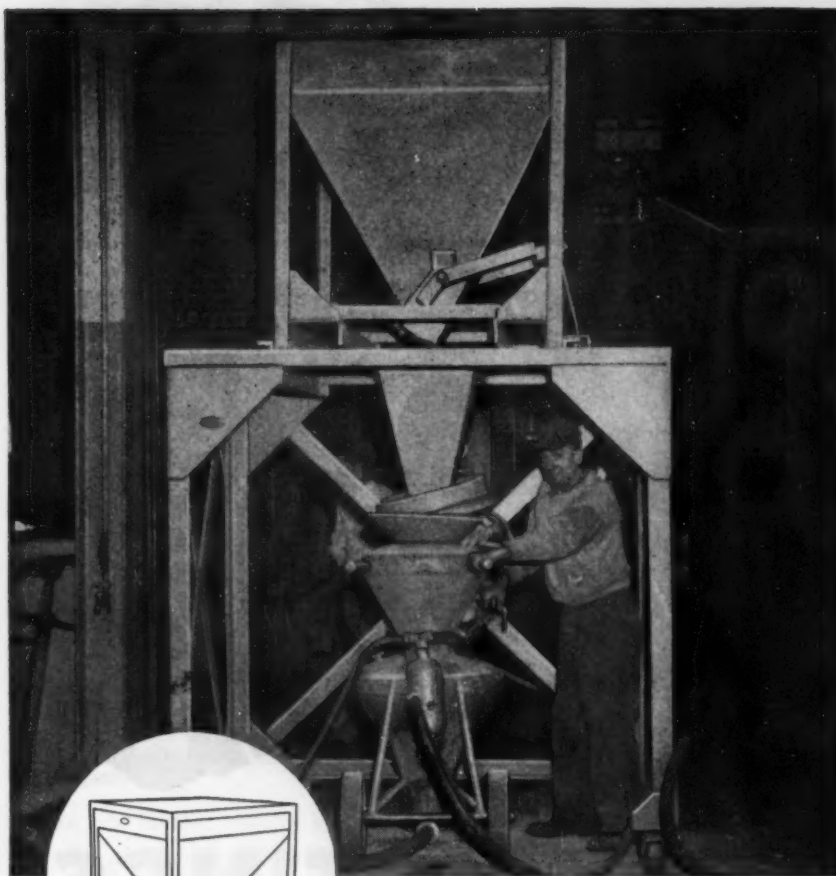
QUALITY STEEL CASTINGS



Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends.

Write or call today. Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. In Canada: Canadian - Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With **PENN IRON SPECIAL EQUIPMENT**

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.



For Further Information Write:

PENN IRON WORKS, INC.

READING, PENNSYLVANIA

—Technical Briefs—

PORCELAIN ENAMEL:

Ceramic coated stainless steels do not absorb carbon in test.

Some stainless steels used in aircraft exhaust systems tend to absorb carbon under severe operating conditions causing precipitation of carbides at or near grain boundaries. This may result in failures of exhaust parts.

The National Bureau of Standards demonstrated in recently laboratory tests that certain ceramic coatings successfully prevent this undesirable carbon absorption.

Metals Studied — Investigated were several NBS ceramic coatings, including types A-417 and A-19H, applied to three 18-8 stainless steels: AISI types 304, 321, and 347. Coated and uncoated specimens of the alloys were subjected to strongly carburizing conditions at 1350°, 1500°, and 1650°F.

NBS has been active for a number of years in developing ceramic protective coatings for metals, particularly for alloys subjected to the high temperatures of aircraft exhaust systems. This work has resulted in several successful coating formulations now in regular commercial use.

Earlier studies demonstrated the ability of ceramic coatings to protect alloys from oxygen and lead bromide, but until now there have been no reported studies of the effectiveness of the coatings in preventing carbon penetration.

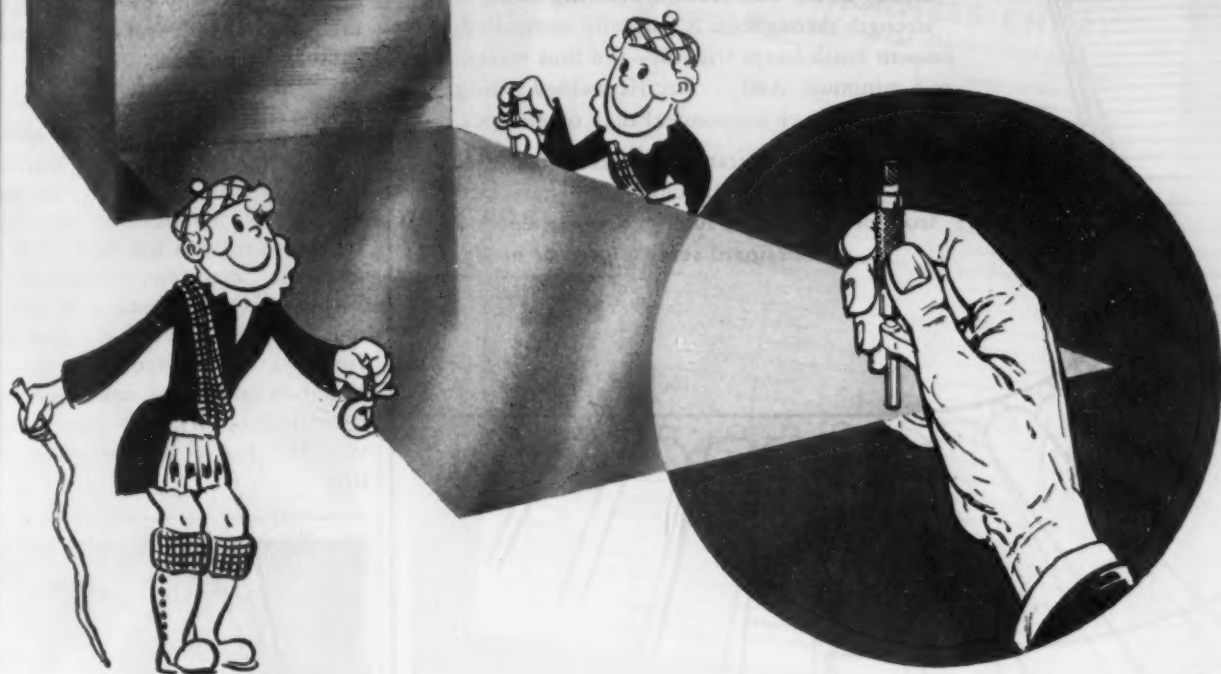
Carburized—Small sheets of the coated and uncoated alloys were packed in an alloy box with a commercial carburizing compound. The box was slowly heated to selected temperatures. After 4 hrs at this temperature, the box was removed from the furnace and allowed to cool in air.

Specimens were examined for significant changes in surface appearance and were then sectioned, etched, and examined metallographically. Although some of the coated specimens showed blistering, spalling, or wrinkling, in

Turn Page

In these days of
HIGH DIE COSTS

MicroRold[®]
Stainless Steel Sheets



WILL SAVE YOU MONEY!

The unusual uniformity of gauge in MicroRold allows for closer die setting, assuring the fabricator of uninterrupted production in stamping, forming and blanking operations.

This closer control of MicroRold sheet thickness *increases the productive life of the die and reduces to an amazing degree*

the number of rejects. One fabricator reports less than $\frac{1}{2}$ of 1% breakage in a 12½" draw on a 17" blank with a rectangular cross-section.

From edge to edge—and end to end—only MicroRold has such outstanding uniformity of gauge.

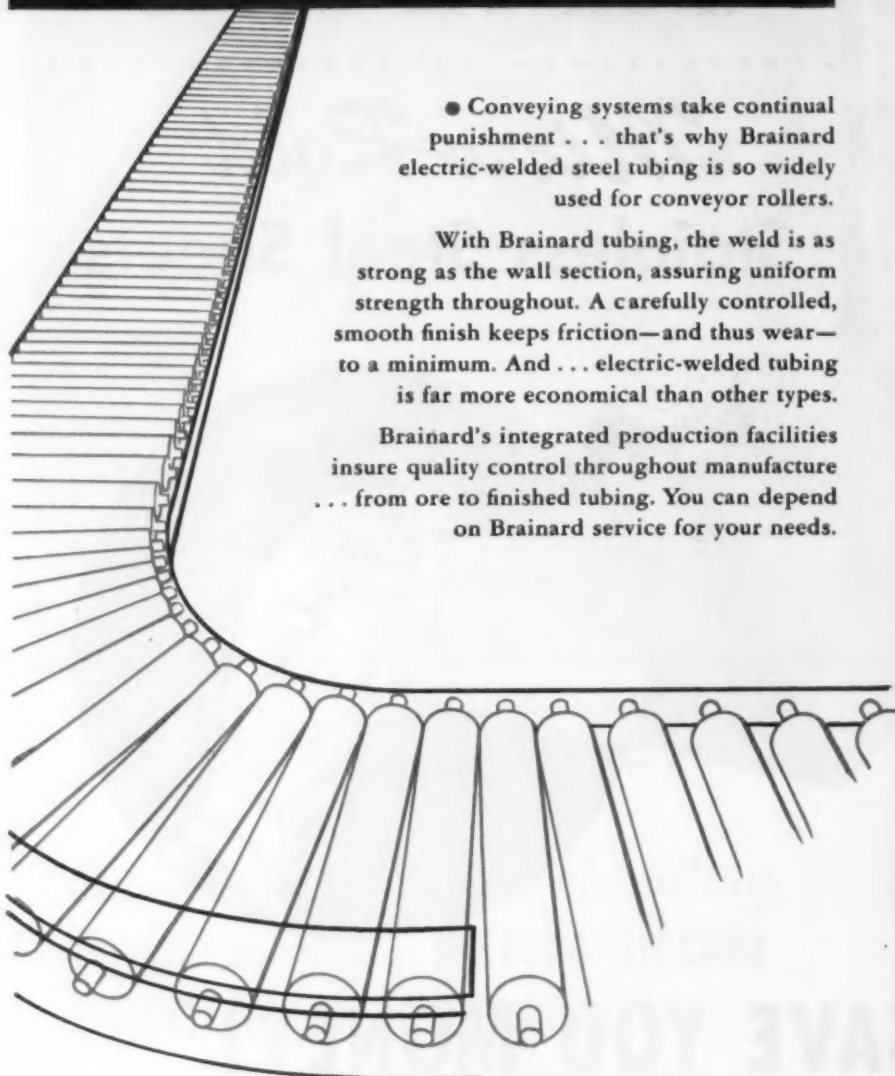
WASHINGTON STEEL CORPORATION

WASHINGTON, PENNSYLVANIA



another job for **Brainard** TUBING

ROADBED FOR SMOOTH CONVEYING



● Conveying systems take continual punishment . . . that's why Brainard electric-welded steel tubing is so widely used for conveyor rollers.

With Brainard tubing, the weld is as strong as the wall section, assuring uniform strength throughout. A carefully controlled, smooth finish keeps friction—and thus wear—to a minimum. And . . . electric-welded tubing is far more economical than other types.

Brainard's integrated production facilities insure quality control throughout manufacture . . . from ore to finished tubing. You can depend on Brainard service for your needs.

EASILY FABRICATED

Brainard tubing is a uniform product made to close tolerances. Has good machining qualities and finish can be supplied as specified. Easily fabricated—can be beaded, expanded, swaged, spun, flanged, upset, grooved, fluted, flattened, tapered, and otherwise formed. Supplied straight or fabricated, sizes 1/2" to 4" O. D.; .025 to .180 gage.

Fast delivery on certain sizes. For further information or catalog, write Brainard Steel Division, Sharon Steel Corporation, Dept. O-9, Griswold Street, Warren, Ohio.

WARREN, OHIO

Brainard

STEEL DIVISION
SHARON STEEL CORPORATION

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SAN FRANCISCO SYRACUSE TOLEDO

—Technical Briefs—

no case did the metal become exposed. Most of the uncoated specimens gave evidence of carbon absorption to depths as great as 0.077 in.

Most Effective—Of those studied, NBS ceramic coating A-19H proved most effective in preventing carbon absorption under all test conditions. However, the extreme severity of the test carburizing conditions would probably never be encountered in the practical operation of aircraft exhaust systems, and any of several coatings might well prove fully satisfactory in service.

Eliminate Furnace Trouble Spot

Substitution of a ball bearing screw and nut assembly for the nut and screw arrangement used on rocking furnaces has eliminated a frequent maintenance headache. Wear on threads and nuts originally used on Hydro-Arc foundry furnaces also presented an operational hazard. The new assembly, developed by Whiting Corp., Harvey, Ill., has a 20-year operating life.



SCINTILLATION counter developed by General Electric in use at Rensselaer Polytechnic Institute, Troy, N. Y., helps track down samples of radio-active materials from atomic furnaces. Alpha, beta, gamma and thermal neutrons can be studied by simply changing phosphor.

FINISHING:

Liquid blast cleaner proves spur to heat treat business.

Installation of liquid blast cleaning equipment at the Benedict-Miller, Inc., steel company in Newark, N. J., had an unexpected result. Installed to remove heat treat scale from molds and dies, the installation is reported to have paid for itself in 3 months, partly through increased heat treating business.

The company operates a commercial heat treat department. Since



DIMENSIONS held to 0.0001 in. are unaffected by liquid blast cleaning operation.

Installation of the liquid blasting equipment, the company finishes most of the items brought in for heat treatment. Quality of surface finish proved popular and a commercial finishing department has been installed. The increase in business, plus operational savings, have helped amortize the equipment cost.

Spurs Business—On some items heat treat business has doubled because finishing service and heat treating are done at some other company. Labor costs have been lowered.

An example of the efficiency of the liquid blasting operation is a brilliant copper-coated one-piece doll head molds. A fine, clean surface finish on the inside of these

Turn Page

"Standard"

Serves Manufacturers Who Use All Shapes and Sizes of MECHANICAL STEEL TUBING

SIZE AND THICKNESS CHART of Electric Weld Tubing for Mechanical Use

TUBE DIAMETER "O.D. SIZE	MAXIMUM WALL		MINIMUM WALL	
	DECIMAL	B. W. GAUGE	DECIMAL	B. W. GAUGE
1/2"	.065"	16	.028"	22
5/8"	.065"	16	.028"	22
3/4"	.065"	16	.028"	22
7/8"	.083"	14	.028"	22
1"	.109"	12	.028"	22
1-1/8"	.109"	12	.028"	22
1-1/4"	.134"	10	.028"	22
1-3/8"	.134"	10	.028"	22
1-1/2"	.148"	9	.035"	20
1-5/8"	.148"	9	.035"	20
1-3/4"	.148"	9	.035"	20
1-7/8"	.165"	8	.035"	20
2"	.165"	8	.035"	20
2-1/4"	.180"	7	.035"	20
2-1/2"	.203"	6	.035"	20
2-3/4"	.203"	6	.035"	20
3"	.220"	5	.049"	18
3-1/4"	.220"	5	.049"	18
3-1/2"	.238"	4	.049"	18
3-3/4"	.238"	4	.049"	18
3-7/8"	.238"	4	.049"	18
4"	.238"	4	.049"	18
4-1/4"	.250"	3	.065"	16
4-1/2"	.250"	3	.065"	16
4-3/4"	.250"	3	.083"	14
5"	.180"	7	.083"	14
5-1/2"	.180"	7	.083"	14

Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.



Manufacturers requiring tubing for civilian or defense production prefer "Standard's" Electric Weld Steel Tubing for many reasons! "Standard's" Electric Weld is produced in one of the most versatile and complete mills of its kind in the world. "Standard's" 23 years of specialized tubing "know-

how", and monthly production of millions of feet of stainless and carbon steel tubing, in wide range of sizes and gauges, assure you of utmost satisfaction. No problem of tolerance, precision or severest application for mechanical, structural, or pressure tubing is too difficult.

STAINLESS STEEL TUBING
1/2" to 3" O.D., .028 to .075 wall

ABOVE CHART COVERS
ROUND CARBON STEEL
TUBING . . .

EQUIVALENT SQUARES,
RECTANGULARS AND
SPECIAL SHAPES ARE
ALSO AVAILABLE.

THE STANDARD TUBE CO.

Detroit 28, Michigan

Welded Tubing Fabricated Parts

STANDARDIZE with STANDARD — It Pays



Niagara's HYGROL DRIES AIR BEST with exact moisture content

- ▶ to control your product's quality
- ▶ to prevent condensation on your product or material
- ▶ to prevent changes due to moist air in contact with your product
- ▶ to protect your material from dampness
- ▶ to protect your processing of moisture-sensitive material
- ▶ to DRY your material or product
- ▶ to pack or store your product safe from moisture damage
- ▶ to get exact moisture control for the precise atmosphere condition you need
- ▶ to provide precise atmospheric conditions for testing
- ▶ to increase your air conditioning capacity
- ▶ to DRY large quantities of fresh air from outdoors

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

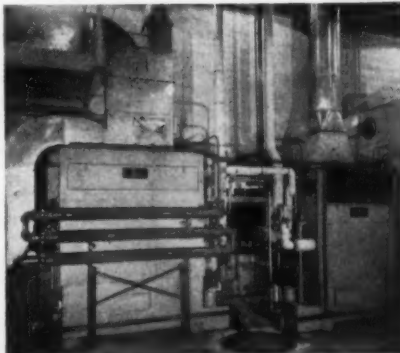
Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.



Niagara Controlled Humidity Air Conditioning

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

For complete information write

NIAGARA BLOWER COMPANY

Dept. IA, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

—Technical Briefs—



LIQUID BLAST equipment, installed to remove scale from molds and dies, also proved a spur to commercial heat treating operations.

molds where it was difficult to polish by hand, was needed.

Time Saver—An estimated 3 or 4 hr of hand labor would be required for each mold. Liquid blasting with the Hydro-Finish, made by Pangborn Corp., Hagerstown, Md., equipment made it possible to finish 80 molds in 5 hours. Quality of the finished surface was superior to that obtainable with hand polishing.

By regulating air pressure, size, and hardness of abrasive, distance of gun from work, blast action can be made so gentle that tolerances as fine as 0.0001 in. are not distorted.

Turn Page



Say, I was thinking . . .

Heavy **BAR** and **SHAPE SHEARS**

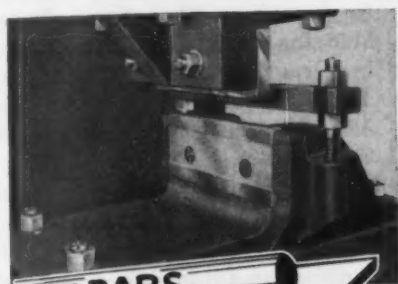
THE TREND IS TO THOMAS

... with interchangeable tools

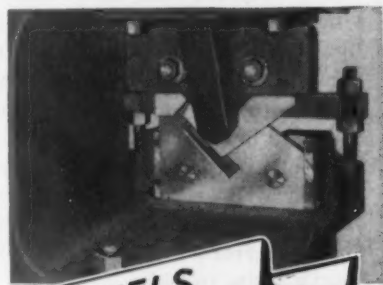
Another example of how Thomas specialization
CUTS SHEARING COSTS



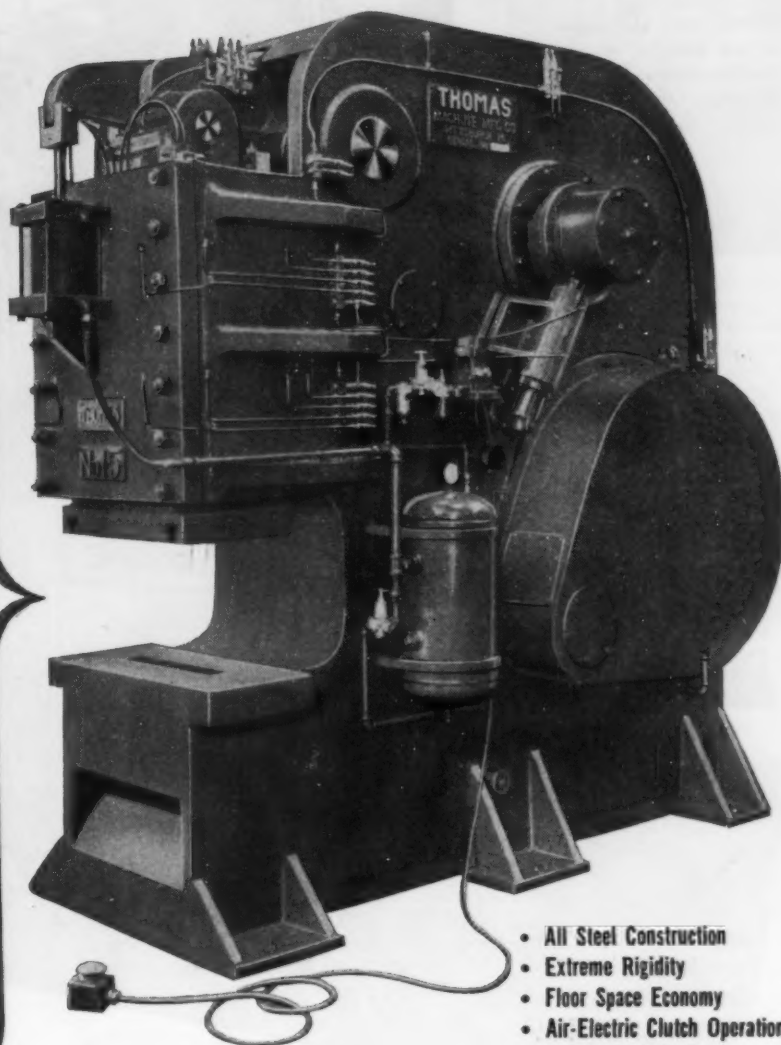
ANGLES



**BAR
FLATS**



CHANNELS



- All Steel Construction
- Extreme Rigidity
- Floor Space Economy
- Air-Electric Clutch Operation
- Flywheel within Frame on Anti-Friction Bearings

Production supervisors will particularly appreciate the quick tool change features, since this results in minimum "down time" when short runs of different shapes are scheduled.

A size to meet your need—50 to 300 tons

THOMAS

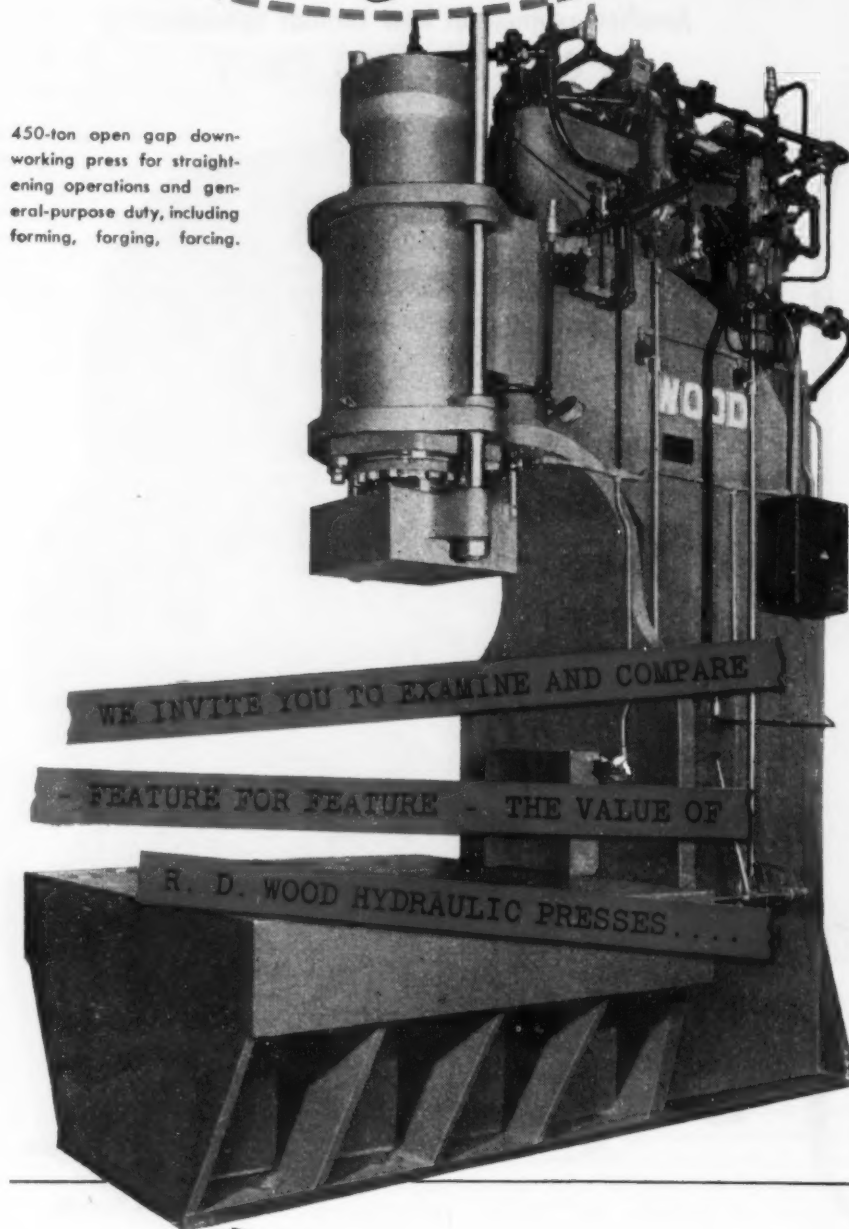
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450-ton open gap down-
 working press for straight-
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 forming, forging, forcing.



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Technical Briefs

GAS IN INDUSTRY:

Power show planners see doubling
 of gas consumption by industry.

Doubling of gas consumption in
 the next 20 yrs, and competitive
 improvements in the treatment
 and combustion of coal are fore-
 cast by power plant and combustion
 engineers.

More and larger super-power
 stations are on the way. More eco-
 nomical generation of power in in-
 dustrial plants, some of which
 rival the great electrical generat-
 ing stations in size, is predicted for
 the future.

Power Show—These and other
 developments in power production
 and engineering are forecast in
 plans for the 20th National Ex-
 position of Power and Mechanical
 Engineering. The show will be
 held the first week in December,
 in Grand Central Palace, New
 York. It is sponsored by the
 American Society of Mechanical
 Engineers.

Rapid advancement of the gas
 turbine to a dominant position,
 and as a supplement to internal
 combustion automobile engines, is
 seen for the future.

Unusual Displays—Many un-
 usual displays will be presented.
 One exhibitor will show centrifu-
 gal castings of special alloys for
 jet engines, including a difficult
 silicon-iron bronze cage blank,
 cast and hot-worked, for anti-fric-
 tion jet aircraft bearings. In this
 display will be finished machined
 centrifugal castings ranging in
 diameter from 1 to 42 in., and in
 length 1/2 in. to 66 in.

Valve—One maker of cast and
 forged steel products will present
 a new type cast steel valve. An-
 other unusual exhibit will present
 a high pressure gate valve with
 breech-lock seal-welded body-bon-
 net connection.

A new 4-in. tube permits assem-
 bly of smaller dust collectors. An
 animated display will show fly-ash
 being separated previous to re-
 firing.

CAPACITORS:

Thin tantalum foil used to make improved capacitors.

Better and smaller electrolytic capacitors are being made from very thin tantalum metal foil in a process recently described in a government research report.

One of the most widely used components in electronic equipment is the electrolytic type capacitor. As currently manufactured, it consists of a chemically-formed gas layer between long, coiled-up strips of aluminum foil.

Tantalum Tried — Scientists working for the Army Signal Corps found that, by using a different chemical with a metal foil of tantalum instead of aluminum, electrolytic capacitors could be made which are far smaller and which do not go bad, as the present type sometimes do, at low temperatures.

Key to the successful manufacture of tantalum capacitors is the economical manufacture of extremely thin tantalum foil. Hence the report of the scientists making this investigation describes two projects; a) manufacture of electrolytic capacitors from tantalum metal foil; and b) economical methods for the manufacture of thin tantalum foils.

Two successful methods for thin tantalum foil manufacture — the rolling method and a vapor deposition method — are described and production methods discussed.



Turn Page

'Surface'



USED FOR GALVANIZING pails, furnace is set in the floor. Heat from 'Surface' direct-fired burners is thoroughly controlled. Bath temperatures are maintained so that rapid erosion of kettle and hot spots on kettle walls are prevented.

Controlled HIGH HEAT input for your galvanizing operation!

PRECISE, CONTROLLED HIGH HEAT INPUTS are essential for economical batch or continuous galvanizing... and dependable part and product galvanizing results from a 'Surface' galvanizing furnace, because alloy layer is accurately controlled.

- ① DIRECT-FIRED BURNERS above supply sufficient heat to compensate rapidly for heat losses due to addition of cold work and spelter to bath.
- ② MINIMUM DROSS FORMATION results from the completely uniform and thoroughly distributed heat provided by direct-fired burners. This allows complete, satisfactory adhesion of coating to stock, maximum kettle life.

SETTINGS to meet all batch and continuous production requirements can be supplied.

WHEN NEXT YOU have a galvanizing problem, a 'Surface' industrial engineer will gladly discuss it with you. Better yet, write now for complete information. No obligation, naturally.

SURFACE COMBUSTION
Corporation

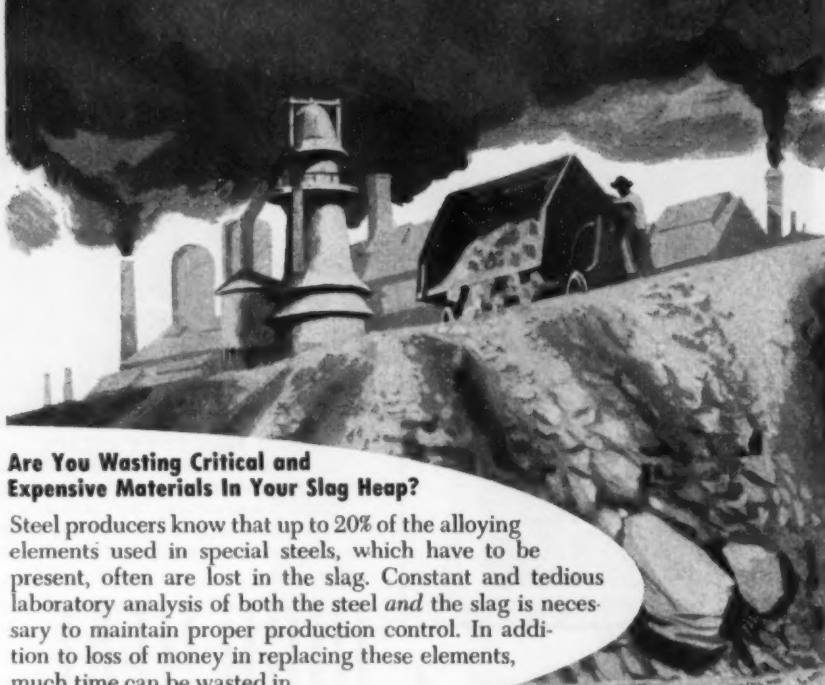
TOLEDO 1, OHIO

'Surface' INDUSTRIAL FURNACES AND BURNERS

Kathabar HUMIDITY CONDITIONING SYSTEMS

Janitrol AUTOMATIC HEATING EQUIPMENT

YOUR PRODUCTION AND PROFITS ARE BEING LOST HERE!

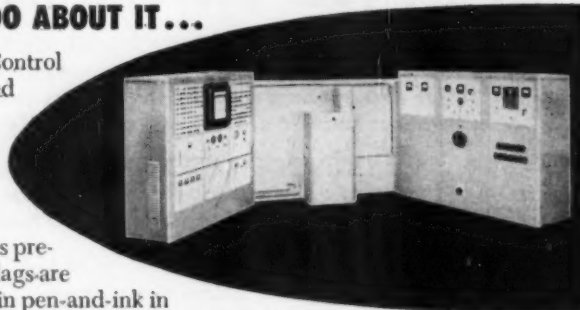


Are You Wasting Critical and Expensive Materials In Your Slag Heap?

Steel producers know that up to 20% of the alloying elements used in special steels, which have to be present, often are lost in the slag. Constant and tedious laboratory analysis of both the steel and the slag is necessary to maintain proper production control. In addition to loss of money in replacing these elements, much time can be wasted in actual production.

HERE'S WHAT YOU CAN DO ABOUT IT...

The ARL Production Control Quantometer—long used for chemical analysis of steel and other alloys—has now been adapted for the analysis of slags! Accurate percentages of elements present in *both* steel and slags are recorded permanently in pen-and-ink in less than two minutes... a great saving in production time and money. This makes it possible to prevent material loss *before* it occurs. Individual Quantometers are not limited to a single type of analysis, but can be designed to meet the requirements of many plant problems. As many as 25 elements as selected by the user can be accurately measured on the instrument—up to 20 simultaneously. The ARL Quantometer is the most advanced type of spectrometer yet developed, and its use can mean a great saving to you in production control costs and vital materials conservation. Write for complete information.



THE ARL LINE ALSO INCLUDES 1.5 AND 2-METER SPECTROGRAPHS, PRECISION SOURCE UNITS, RAMAN SPECTROGRAPHS AND RELATED ACCESSORIES.



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NACE MEETING:

Many corrosion subjects to be discussed at New Orleans.

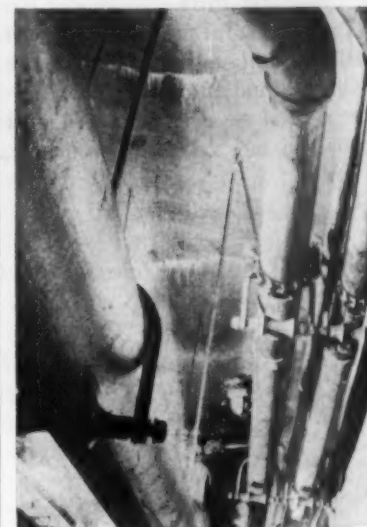
Prevention of corrosion in offshore oil well drilling structures and marine tankers, and how mill scale affects the corrosion rate of steel in salt water are among the subjects scheduled for discussion at the South Central Region, National Assn. of Corrosion Engineers', Oct. 1 to 3 at New Orleans.

Engineering data on corrosion of oil refineries, gas condensate wells and the protection of buried or submerged pipe lines from external corrosion with coatings or cathodic protection, will also be presented.

Eighteen technical papers in four symposia have been outlined by Technical Program Chairman John E. Loeffler of Thornhill-Craver Co., Houston, Tex. The meeting at the Jung Hotel will also include sessions of NACE technical practices committees.

Bearing Standards Adopted

A 10-nation international standardization committee, recently reached agreement on boundary dimensions for some 1600 bearing sizes, the American Standards Assn. has reported.



WROUGHT IRON water pipes at new Southerly Sewage Disposal plant in Cleveland, Ohio. More than 3000 ft of wrought iron pipe has been installed at the plant for water lines, sludge digestion, and other sewage plant services.

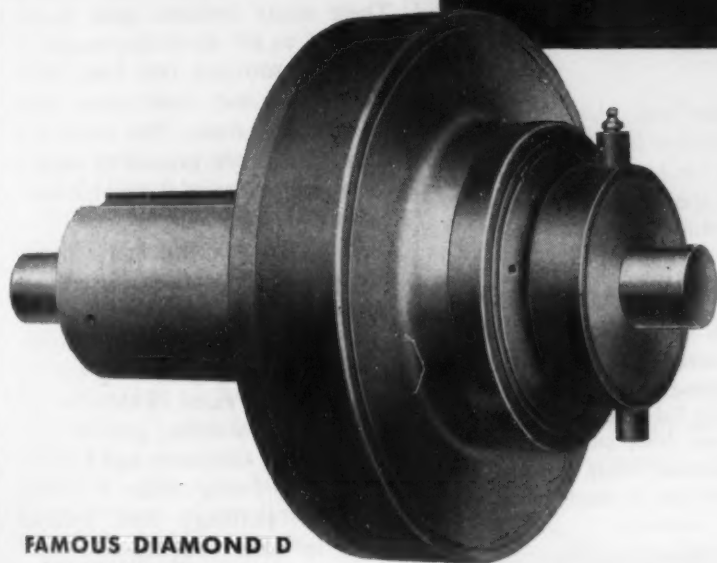
ROLLING GRIP
FRICTION CLUTCH
"NO TOGGLES!"

1/3 to 21 H.P. CAPACITIES



DODGE FRICTION CLUTCHES

Proved in thousands of industry's toughest jobs!



FAMOUS DIAMOND D
FRICTION CLUTCH
CAPACITIES UP TO
470 H.P.!

DODGE

of Mishawaka, Ind.

Look to Dodge for the clutches to meet your specific needs. Dodge leadership in the field of mechanical power transmission is strikingly evidenced in the advanced design and engineering of a complete line of friction clutches, in a full range of sizes with capacities from 1/3 hp to 470 hp.

ROLLING GRIP FRICTION CLUTCH

New and simplified design gives new ease of control with positive drive and extreme ruggedness. There are no toggles! Instead the mechanism shifts smoothly on hardened steel balls—and has the positive grip of a wedge. (Operating parts enclosed for safety yet quickly accessible for service). Available from distributors' stocks in two types—Bolted Plate or Gear Tooth Mechanism in sizes from 1/3 hp to 21 hp at 100 rpm.

DIAMOND D FRICTION CLUTCH

Built with the stamina for grueling service, this rugged clutch has a world-wide reputation for dependability. It's compact, too—completely enclosed in both engaged and disengaged positions. Adjustment is simple—an Allen wrench at one point does the job. Available in single, double or triple friction plate design in several types of construction. Capacities from 21 hp to 470 hp at 100 rpm.

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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.



SEALED-LIFE V-BELTS AND TAPER-LOCK SHEAVES



TORQUE-ARM SPEED REDUCER



DODGE-TIMKEN PILLOW BLOCKS

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS

the WHEELABRATOR® *Swing Table*

**SAVES for Job Shop
and Production Foundry**



Impressive performance records are being made with the Wheelabrator Swing Table in job shops and high production foundries alike. With this versatile multi-purpose machine large intricate castings and small fragile parts are cleaned at the same high speed and low cost—a fact proved in more than a hundred installations.

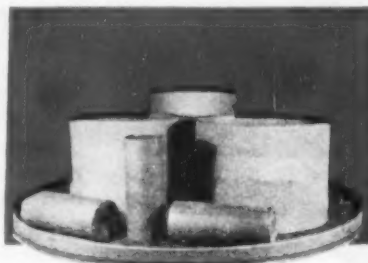


cuts cleaning costs 66%

The Elkhart Iron Works of Elkhart, Indiana, uses a Swing Table to clean work formerly done in 3 tumbling mills and an airblast room. The Swing Table has reduced cleaning costs per ton from \$8.095 to \$2.655. It has also eliminated costly breakage and produced a finish that is much more satisfactory to their customers.

cleans 20 tons of castings at cost of 6 tons

A Swing Table at the Toronto Foundry Company is cleaning 2/3rds more work with 1/2 the labor. It has cut metal cleaning costs 76%, saved 10% in machining costs and eliminated all breakage. The savings it makes will pay its complete cost in 2 years.



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American

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510 S. Byrkit St., Mishawaka, Ind.

Wheelabrator®
AIRLESS BLAST
CLEANING

MILLING:

Higher rake angles permit improved tool performance.

Rake angles on milling cutters between 25° and 40° will give longer tool life with improved finish on some types of steel, a recent study on milling cutter rake angle indicates.

Questioning the use of the usual 5° to 15° rake angle which tradition has established for milling cutters, J. H. Crawford and M. E. Merchant of Cincinnati Milling Machine Co. made an exhaustive study of the subject.

A New Slant—What they found throws new light on grinding of high speed steel milling cutters. Their study included rake angles from 0° to 50° at cutting speeds of 70, 160, 300 and 500 fpm. SAE 1020 hot-rolled steel slabs were used for the study. The pieces, 2 x 8 x 18 in. were ground to remove scale found harmful to high rake milling operations.

Improved tool life and superior surface finish obtained were believed due to:

Higher shear angle and shorter path of shear; lessened cutting forces; lower value of chip-tool interface temperature; greater metal removing efficiency and a correspondingly lower value for work done in cutting; less built-up edge, in turn causing less wear due to abrasion and chipping.

Higher Speeds—At higher cutting speeds, a maximum tool life is obtained in face milling with rake angles of 30° to 40°.

With very low rake angles, shear angle is low, tooth forces are high, a built-up edge is present and tool-chip interface temperatures are high, though falling with increasing rake angle.

With very high rake angles, the tooth form is fragile, tooth forces are no longer decreasing appreciably with increasing rake, friction coefficient is high and rising rapidly and tool-chip interface temperatures are high and rising rapidly with increasing rake angle.

Advantages—High rake angle cutters permit higher cutting speed for the same tool life; longer tool life at the same cutting speed; better workpiece finish due to the absence of built-up edge; less power required for the same metal removal rate; cutting forces are lower reducing deflection and increasing accuracy.

Disadvantages—Disadvantages, however, are:

More care is required in handling and storage of the cutters due to their comparatively fragile tooth form.

Greater care must be exercised in sharpening high rake cutters as there is less metal present in the tooth to dissipate the heat generated in grinding.

High rake cutters do not stand up well under abrasion so usually cannot be used for roughing or finishing cuts into scale or surfaces with abrasive inclusions. A precisely machined or ground surface is best.

Cutting fluid used must be generous to aid in heat dissipation.

While the use of higher rake gives improved performance when milling SAE 1020 steel with some other few types of steel improved performance is not obtained in practice.

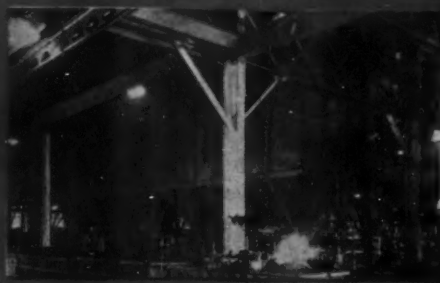
Copies of the complete paper, "The Influence of Higher Rake Angles On Performance in Milling," may be obtained from the Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Turn Page



How much for \$1.50 worth of steak?

"Not a dime for repairs in years"



at the
OLIVER CORPORATION

as one **DUSTUBE** ventilates

12 grinders
6 tumbling mills
3 blast cleaning machines



In the gray iron foundry of the Oliver Corp., South Bend, Indiana, one large Dustube Collector is ventilating 6 double end grinders, 6 tumbling mills, Wheelabrator Monorail Cabinet and two Wheelabrator Tumblasts. Although this Dustube is collecting an unusually heavy volume of dust, it effectively controls all dust without trouble. Mr. James Reddick, Superintendent of Maintenance, explains the trouble-free operations of the Dustube as follows:



Mr. James Reddick

"We have not spent a dime for repairs in years. Maintenance is easy and inexpensive with few working parts to wear. Inspection of the tubes takes only a few minutes of our regular oiling crew—one glance tells tube conditions. The Dustube is certainly the least expensive of all dry type collectors to operate and maintain, and I can go one step further and say that the Dustubes are the most trouble-free units in our whole plant."

The record of the Dustube for efficient dust collection at less cost is worth investigating. Write today for full information.

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D3081

POWDER METAL:

Dust 80 pct off gear production costs by using powder metal.

A spur and mitre gear used in a business machine is being made at a reduction of 80 pct in production costs by using powder metallurgy. Big saving in production of this part is the elimination of 15 machining and assembly operations.

The gear is made by Powdered Metal Products Corp., Franklin Park, Ill. If machined from stock by conventional methods the part would be prohibitively expensive.

Many Operations—Blanks for the spur and mitre sections would have to be shaped separately on turret lathes, a gear shaper would be required for cutting of teeth and burring of the spur gear; and a gear cutter would be necessary to cut the teeth of the mitre gear.

In addition, assembly operations would require further deburring as well as degreasing of both parts, plus soldering to join the two

parts followed by furnace or induction brazing.

One Stroke—By powder metal processing the gear is formed as a single piece at a single stroke. The metal powder is dumped into the hopper of a Stokes powder metal press, from which it flows into the die cavity to be compressed by punches moving simultaneously from above and below.

After the piece has been pressed, it is relatively fragile and must be sintered; after sintering, it is tough enough to meet all strength requirements. Extremely close tolerances eliminate the need for final machining or finishing or assembly.

Other Parts—Similar savings in manufacturing other gears with powder metal. A small bevel gear for a power drill with a tensile strength of 100,000 psi, have been made with a saving of eight machine operations and an 86 pct reduction in cost.

A helical and spur gear for a washing machine transmission with 18 machine operations eliminated saved 88 pct of total cost.

Less Scrap—Absence of scrap and reduction of stock inventories are possible. Half a dozen types of metal powders will replace a large inventory of bar stocks of varying sizes, shapes, and compositions.

Many parts for modern machines are so complex in profile that they are economically made only by the powder metal process. Automobile manufacturers have discovered that powder metal parts are unbeatable in oil pumps and distributor mechanisms.

NAME PLATES:

Corroded plates yield secrets with acid etch treatment.

Identification plates on boilers and other types of power equipment frequently become corroded after several years of exposure. As a result, the information they contain is obliterated. In many cases, this information is required for the renewal of either an operating license or insurance coverage for the equipment.

Recently, to determine the identification number on the shell of a steam boiler crane, engineers at Sam Tour & Co., industrial consulting firm, successfully used an acid etching treatment.

Cold Work Factor—The area in which the obliterated information was known to exist was first cleaned with a solvent to dissolve the layer of surface scale. Then, the area was treated with an acidic solution.

Identification numbers, dates of previous inspections, and other information required for the issuance of a new license and insurance were then easily legible.

Success of the method depends on the special response of cold-worked steel to acid etching. Thus, because the die stamping of numbers on metal cold works the metal, the numbers can be restored despite subsequent corrosion or abrasion.

Specify...The ABBOTT METHOD

BURNISHING

MATERIALS & BARRELS

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LONGER OPERATING LIFE

Manufacturers of Deep Hardened and Tempered Carbon Steel Bearing Balls, Grinding and Graining Materials.

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Now You can fill your needs
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**Welded and Cold Drawn
Stainless Steel Tubing**

Special Purpose Tubing In All Available Materials

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HELICAL TUBE CORPORATION
19 Washington St., East Orange, N. J.
Manufacturing Plant—Grand Rapids, Michigan

Anxious Consumers Pressing for Quick Delivery

**Consumers still pulling all stops for quick steel delivery . . .
But easing supply is expected by next year . . . Industry
optimism stems largely from better material supply.**

Unrelenting pressure continues to keep the steel market hot. But there is plenty of evidence that the pressure is temporary—that many consumers actually distrust the market beyond the next 3 or 4 months.

This is the most significant result of a survey among steel producers and consumers in major industrial areas just completed by THE IRON AGE.

Steel consumers are using every trick they can think of to get steel. But they all want quick delivery. Many show little interest in delivery promises beyond 3 or 4 months. High priced material quoted on extended delivery hardly gets beyond the conversation stage.

Agreement—For once steel producers and consumers are in fairly close agreement in their appraisals of the market. Here are some points of agreement that have been pretty well established in interviews by IRON AGE editors: (1) Demand for quick steel delivery is terrific. (2) Demand for delivery after the first of the year is not so strong. (3) Most consumers will not touch conversion beyond the first of the year. (4) Demand for merchant and specialty steel products is not so intense and is expected to fade first. (5) Demand for heavy plates and structurals, oil country goods, special alloys and bars (both hot-rolled and cold-finished) is expected to remain strong after other products have eased.

Optimism of steel producers is explained partly by the fact that worries over raw materials have subsided. Since settlement of the steel strike iron ore shipments on

the Great Lakes have been at a record pace. They have been aided by (1) additional ships coming into service and (2) the high water level on the Lakes which permits heavier loading. Despite the record rate of consumption, which is expected to prevail for the next several months, there is an excellent chance that a damaging ore shortage can be circumvented. All-rail shipments—though expensive and annoying—will be the industry's ace-in-the-hole, if needed.

Scrap supplies are excellent. With some consumers now it is more a question of storage space than availability. Scrap is expected to become tight again this winter, but right now it is abundant and inventories can be built almost at will.

Despite the brighter outlook for steel supply, competition for the metal is still intense this week. Lean and unbalanced inventories cause the pressure to mount above what is dictated by manufacturing schedules. Military customers will aggravate the situation for at least the next 2 months by demanding and getting make-up tonnage above their regular quotas.

90 Days—Conversion steel is in strong demand, but there is practically no interest in arrangements beyond the next 90 days. Two reasons have been suggested for this: (1) Major conversion customers lack strong faith in future demand for their manufactured products. (2) Conversion customers believe that the high rate of production will go a long way toward satisfying pent up demand by the first quarter of next year.

Steel people expect that mer-

chant items and small rod will require considerable selling before the end of this year. They point out that we are geared for over production and that the economy appears now to be dropping back toward a normal peace time business level after 5 years of whopping production.

Hot-rolled sheets and strip might be fairly well caught up by early December. Wire products and fencing will require selling as early as the latter part of November. Demand for plates, bars, pipe, heavy structurals and cold-rolled sheets will hold well into 1953.

Auto Sheets—Demand for cold-rolled sheets is stemming largely from automakers. They are engaged in some of the most feverish steel buying activity that has hit the market for a long time. It seems almost impossible that enough steel can be found to fulfill the high production goal they have set for themselves—455,000 cars and 117,000 trucks in September alone. If attained this would be the highest monthly production since June 1951.

Some manufacturers seeking to place one-shot orders for quick delivery may benefit from price cuts and shorter delivery promises from abroad. Export prices of European producers have recently been slashed \$5 to \$12 per ton, with some items down \$15. Some items quoted in July for 8 to 10 weeks delivery are now being promised for immediate shipment or within 2 to 3 weeks. The competing countries are jockeying for place when export quotas are handed down under the Schuman Plan. Amount of export business done by member countries during the first 9 months of this year is expected to affect the size of quotas granted each nation by the plan's Steering Committee, THE IRON AGE has learned.



canvassing the neighborhood for special steel?

Ring the bell of Crucible's nearest warehouse. We have good stocks on hand of our more than 400 specialty steels, and a complete stock of *all* our tool steels.

You'll find one of our conveniently-located warehouses not far from your plant, so you can count on prompt and speedy delivery. Get in touch with us today.

Stocks maintained of:

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first name in special purpose steels

52 years of *Fine* steelmaking

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Market Briefs and Bulletins

Restrictions Lifted—National Production Authority this week removed restrictions from secondary and imported steel products which require warehouses to hold 50 pct of their stocks for a 15-day period to meet defense needs. Officials said secondary products seldom met military and atomic energy requirements and that lifting the freeze would eliminate hardships on supporting programs which can use them.

New Contract—Wisconsin Steel at Chicago recently granted its 4575 employees wage increases ranging from 12.5¢ to 16¢ per hr through all grades including production, maintenance, clerical, and technical workers. The new wage contract will run to 1955, with wage reopeners for 1953 and 1954. Wisconsin workers will receive double time for holidays worked, single time for holidays not worked, and liberalized hospitalization, insurance, and health benefits.

Gas Pipe Allotments—More than 300,000 tons of pipe were allotted this week for last-quarter construction work on natural gas pipeline projects. Some 136,800 tons were allocated to 5 major projects. They were: Wilcox Trend Gathering System, Dallas 20,952 tons; El Paso Natural Gas Co., El Paso, 20,505 tons; Pacific Gas & Electric Co., San Francisco, 17,000 tons; Tennessee Gas Transmission Co., Houston, 42,854 tons; Southern Natural Gas Co., Birmingham, 35,503 tons. Another 167,567 tons of pipe were allocated to 400 smaller projects for last quarter use.

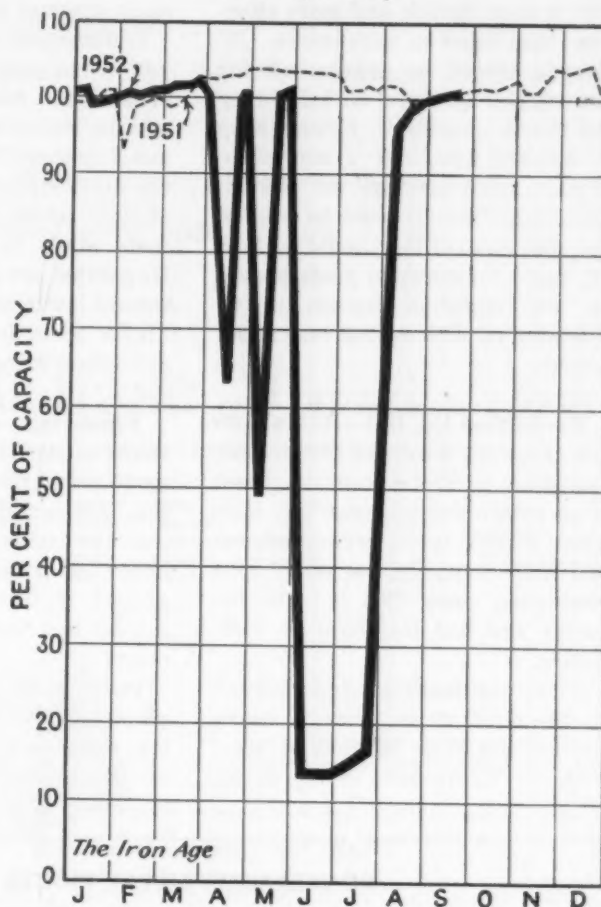
Substitution—Possibility of substituting welded tubing for seamless to meet specific military requirements will be considered at a meeting of a technical advisory group to the National Production Authority. Also slated for consideration at the meeting is the advisability of lengthening lead time on seamless carbon mechanical and stainless welded tubing.

Salary Increase—Salaried employees of U. S. Steel Co. are getting a raise retroactive from Mar. 1. Increases extend up to 11 pct.

Inventory Complaint—National Production Authority is appointing a task group to look into complaints by barge builders that the present 30-day inventory ceiling is working undue hardship on the industry. Industry makes the point that steel deliveries may not be received in conformation with construction schedules. This frequently makes it necessary to hold some types of earmarked steel for considerable periods while other steel, needed first, is being shipped in.

Pig Price Boost—Prices of pig iron delivered on or after July 26 were increased by approximately 4.7 pct as a result of a government action designed to produce proportionate price rises for pig iron and carbon steel. The increase amounts to \$2.50 per ton for pig iron with less than 5 pct silicon and \$3 per ton for grades and classes containing 5 to 17 pct silicon. Office of Price Stabilization says these boosts equal 4.7 pct of the ceiling prices set for No. 2 foundry pig and silvery pig, respectively. Authority for the higher prices is Supplementary Reg. 116 to the General Ceiling Price Reg. While most producers made prices retroactive to July 26, a few did not.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Aug. 31	101.0	101.0	103.0	100.0	104.0	104.5	99.0	104.0	96.0	101.0	90.5	90.0	103.5	100.5
Sept. 7	102.0	102.5	103.0	100.0	101.0	104.5	104.5	103.0	97.0	101.0	92.0	101.0	95.0	101.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 106,587,570 net tons.

Aluminum Seen Easing Slowly

DPA's Sam Anderson points up stockpile urgency, says not enough available in '53 . . . Industry makes own suggestions . . . Series of setbacks have hit output—By R. L. Hatschek.

Defense Production Administration's aluminum boss Sam Anderson said last week that stockpile needs are urgent and that more aluminum must go into the stockpile in 1953 than will be available for the purpose. The industry's Washington committee had some suggestions of its own.

They feel that: (1) Industrial inventories should be built up since this is more flexible and more effective than ingot in warehouses, (2) Canada should be approached for any surplus of metal to help bring the fourth quarter U. S. supply up to 365,500 tons, (3) a method to obviate repayment of the British aluminum "loan" should be worked out, (4) stockpiling should be held off, and (5) stockpile goals should be left tentative enough to fit changing conditions that may affect output.

Production Up, But—Actual output figure for July was 78,368 tons, compared to 77,476 tons in June. High month for the year was May when 80,804 tons were produced and more capacity has come into production since then but the industry has had its share of difficulties.

First, new facilities were delayed by the steel strike, then a storm knocked out some potlines at Massena, N. Y., drought in the South

sliced a little production off, and now low water in the Northwest is cutting output there (See p. 87).

Notes on Taiya—Given trouble-free and speedy approval by the various governments concerned, Aluminum Co. of America can start work in the Taiya project (See THE IRON AGE, Aug. 28, 1952, p. 45) as soon as late spring or early summer next year.

Commenting recently on the subject, Alcoa president I. W. (Chief) Wilson said Alaskan produced aluminum would be competitive with metal produced in the U. S. Despite the low-cost, highly efficient hydroelectric set-up, building and labor costs would be higher in Alaska. He pointed out that the trend is not toward lower cost aluminum due to higher costs for gas, coal, freight and other items.

Financing —Alcoa has said it would settle for rapid amortization on 50 pct of the cost of the installation, not including power facilities, but the company would frankly have to give a second thought to the project if fast tax writeoff could not be had for one reason or another.

Initial stage of 800,000-hp power plant and 200,000-ton-a-year smelter would cost \$400 million with all the extras thrown in. Second

stage, doubling both power output and smelting capacity, would cost an additional \$300 million. Financing plans at this point are uncertain, but some of the capital might be borrowed and the rest obtained through equity financing.

Tin Markets—At the end of last week the Singapore tin market took a substantial jump to the c.i.f. New York equivalent of roughly \$1.22%. But it didn't have much of an effect on trading in either the London or New York markets. London did rise slightly, though nothing like the Far Eastern boost, while New York stayed firm at just under the Reconstruction Finance Corp. price of \$1.21½. This, of course, is the limit which the outside tin market may approach—but never quite reach.

Some members of the trade were reported to be of the opinion that the Singapore price cannot hold for very long.

Zinc A-Plenty —Producers of zinc are out beating the bush in an attempt to sell their currently huge stocks—97,000 tons on July 31. One of their main difficulties apparently is the fact that potential consumers are not aware that zinc is so plentiful. There seems to remain a feeling that other materials should be substituted for zinc, which was scarce last year.

On the contrary, American Zinc Institute points out that there are no longer any controls on the metal but price—and the current market price is a nickel a pound under the ceiling. No longer classed as critical by the government, zinc is not even being bought for the stockpile any more.

Lead Steady—Principal suppliers of lead seem to be coasting along with no difficulty. Orders already booked for the month are good. With the government's intermediate "stockpile" buying holding the bottom up, the current price is sure to hold firm at least for the time being.

NONFERROUS METAL PRICES

	Sept. 3	Sept. 4	Sept. 5	Sept. 6	Sept. 8	Sept. 9
Copper, electro, Conn	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.21¾	\$1.21¾	\$1.21¾	.....	\$1.21¾	\$1.21¾*
Zinc, East St. Louis	14.00	14.00	14.00	14.00	14.00	14.00
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

*Tentative.

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Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 23, 38, 31.6¢; 48, 61S-O, 33.6¢; 62S, 35.8¢; 24S-O, 24S-OAL, 24.5¢; 76S-O, 76S-OAL, 41.9¢; 0.081 in., 23, 38, 32.8¢; 48, 61S-O, 35.2¢; 62S, 37.4¢; 24S-O, 24S-OAL, 25.8¢; 76S-O, 76S-OAL, 43.9¢; 0.032 in., 23, 38, 34.5¢; 48, 61S-O, 39.0¢; 62S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 76S-O, 76S-OAL, 54.8¢.

Plate 1/4 in. and heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 53S-F, 33.4¢; 61S-O, 32.3¢; 24S-O, 24S-OAL, 34.0¢; 76S-O, 76S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to 112.2¢; 36 to 38, 45.9¢ to 179.9¢.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 35.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, 1/4 to 11/32 in., 56.2¢ to 44.1¢; 1/2 to 1 1/4 in., 43.6¢ to 41.0¢; 1 1/2 to 3 in., 40.4¢ to 37.8¢; 17S-Ts, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 23, 41.5¢ to 30.5¢; 62S, 50.4 to 36.8¢; 66S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 38.9¢.

Extruded Tubing: Rounds, 62S-T5, OD in in.: 1 1/4 to 2, 38.9¢ to 55.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in. x 28 in., per sheet, 72 in., \$1.199; 96 in., \$1.598; 120 in., \$1.997; 144 in., \$2.398. 0.24 in. x 28 in., 72 in., \$1.448; 96 in., \$1.931; 120 in., \$2.414; 144 in., \$2.897. Coiled sheet: 0.019 in. x 28 in., 26.6¢ per lb; 0.024 in. x 28 in., 28.2¢ per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: F51-O, 1/4 in., 63¢; 3/16 in., 65¢; 1/2 in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., 1/4 to 0.311 in., 74¢; 1/2 to 1/4 in., 67.5¢; 1 1/4 to 1.749 in., 58¢; 2 1/2 to 5 in., 48.5¢. Other alloys higher. Base up to 1/2 in. diam, 10,000 lb; 1/2 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 52.8¢; 4 to 5 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; 1/4 in. to 5/16, \$1.40; 5/16 to 3/4, \$1.26; 3/4 to 1, \$1.14; 1 to 2 in., 76¢; 0.165 to 0.219, 1/2 to 3/4, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1 1/4 in., 10,000 lb; 1 1/4 in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, \$15; Plate, HR, \$12; Wire, rolled and/or drawn, \$10; Bar, HR or forged, \$6; Forgings, \$8.

Nickel and Monel

(Base prices, f.o.b. mill)

"A" Nickel Monel
Sheets, cold-rolled 77 60 1/2
Strip, cold-rolled 83 63 1/2
Rods and bars 73 58 1/2
Angles, hot-rolled 73 58 1/2
Plates 75 59 1/2
Seamless tubes 106 93 1/2
Shot and blocks 52 1/2

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52		45.12
Copper, h-r		41.37	
Copper, drawn		42.62	
Low brass	42.34	42.03	
Yellow brass	40.17	39.86	
Red brass	43.10	42.79	
Naval brass	44.72	38.78	40.04
Leaded brass			38.02
Com'l bronze	44.39	44.08	
Mang. bronze	48.44	42.83	43.30
Phos. bronze	64.72	64.97	
Muntz metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.18	

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 20.00
Aluminum pig 19.00
Antimony, American, Laredo, Tex. 39.00
Beryllium copper, 3.75-4.25% Be. \$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be \$69.50
Bismuth, ton lots \$2.25
Cadmium, del'd \$2.00
Cobalt, 97-99% (per lb) \$2.40 to \$2.47
Copper, electro, Conn. Valley 24.50
Copper, Lake, delivered 24.625
Gold, U. S. Treas., dollars per oz. \$35.00
Indium, 99.8%, dollars per troy oz. \$2.25
Iridium, dollars per troy oz. \$200
Lead, St. Louis 16.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb. 24.50
Magnesium, sticks, 100 to 4200 lb. 42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York \$186 to \$189
Nickel electro, f.o.b. N. Y. warehouse 59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel 52.75
Palladium, dollars per troy oz. \$24.00
Platinum, dollars per troy oz. \$90 to \$93
Silver, New York, cents per oz. 83.25
Tin, New York \$1.21 1/4
Titanium, sponge \$5.00
Zinc, East St. Louis 14.00
Zinc, New York 14.83
Zirconium copper, 50 pct \$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot
No. 115 27.25
No. 120 26.75
No. 123 26.25
80-10-10 ingot
No. 305 33.00
No. 315 30.50
88-10-2 ingot
No. 210 41.50
No. 315 40.00
No. 245 34.50
Yellow ingot
No. 405 23.25
Manganese bronze
No. 421 30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 20.6
0.60 copper, max. 20.4
Piston alloys (No. 122 type) 20.5
No. 12 alum. (No. 2 grade) 19.5
108 alloy 20.6
195 alloy 20.6
13 alloy (0.60 copper max.) 20.3
ASX-679 20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97 1/2% 18.30
Grade 2—92-95% 18.60
Grade 3—90-92% 18.40
Grade 4—85-90% 18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper
Cast, oval, 15 in. or longer 37.84
Electrodeposited 33 1/4
Flat rolled 38.34
Forged ball anodes 43
Brass, 80-20
Cast, oval, 15 in. or longer 34 1/4
Zinc, oval 26 1/2
Ball, anodes 25 1/2
Nickel, 99 pct plus
Cast 76.00
Rolled, depolarized 77.00
Cadmium \$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn. 97 1/4

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63
Copper sulfate, 99.5 crystals, bbl. 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 20 1/4
Nickel chloride, 375 lb drum 27 1/4
Silver cyanide, 100 oz lots, per oz. 67 1/4
Sodium cyanide, 96 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1/2¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy Turnings
Copper	21 1/4 20 1/4
Yellow brass	19 1/4 17 1/4
Red brass	20 1/4 19 1/4
Comm. bronze	20 1/4 19 1/4
Mang. bronze	18 1/4 17 1/4
Brass rod ends	18 1/4

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire 19.30
No. 2 copper wire 17.75
Light copper 16.50
Refinery brass 17.35
Radiators 14.75
* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire 19.35
No. 2 copper wire 17.75
Light copper 16.50
No. 1 composition 18.50
No. 1 comp. turnings 18.25
Rolled brass 16.50
Brass pipe 16.50
Radiators 14.75

Aluminum

Mixed old cast 9 — 1 1/4
Mixed new clips 10 — 11
Mixed turnings, dry 9 — 1 1/4
Pots and pans 8 1/4 — 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire 18 1/4 — 19 1/4
No. 2 heavy copper and wire 17 — 17 1/4
Light copper 16 1/4 — 16
New type shell cuttings 14 — 14 1/4
Auto radiators (unswaged) 17 1/4 — 18
No. 1 composition 17 1/4 — 18
No. 1 composition turnings 17 — 17 1/4
Unlined red car boxes 16 1/4 — 17
Cocks and faucets 16 — 18 1/4
Mixed heavy yellow brass 11 1/4 — 12
Old rolled brass 14 1/4 — 15
Brass pipe 15 1/4 — 16
New soft brass clippings 16 — 16 1/4
Brass rod ends 15 1/4 — 16
No. 1 brass rod turnings 15 — 15 1/4

Aluminum

Alum. pistons and struts 6 — 6 1/4
Aluminum crankcases 7 — 7 1/4
2S aluminum clippings 10 — 10 1/4
Old sheet and utensils 7 — 7 1/4
Borings and turnings 6 — 6
Misc. cast aluminum 7 — 7 1/4
Dural clips (24S) 7 — 7 1/4

Zinc

New zinc clippings 8 — 8 1/4
Old zinc 6 — 6 1/4
Zinc routings 3 1/4 — 4 1/4
Old die cast scrap 4 1/4 — 5

Nickel and Monel

Pure nickel clippings 35 — 36
Clean nickel turnings 35 — 36
Nickel anodes 35 — 36
Nickel rod ends 35 — 36
New Monel clippings 28 — 29
Clean Monel turnings 20 — 21
Old sheet Monel 28 — 29
Nickel silver clippings, mixed 13 — 14
Nickel silver turnings, mixed 12 — 13

Lead

Soft scrap, lead 13 1/2 — 13
Battery plates (dry) 7 — 7 1/4
Batteries, acid free 4 — 5

Magnesium

Segregated solids 15 — 16
Castings 14 — 15

Miscellaneous

Block tin 100 — 110
No. 1 pewter 70
No. 1 auto babbitt 55 — 60
Mixed common babbitt 14 1/4 — 14 1/2
Solder joints 19 — 20
Siphon tops 19 — 19 1/4
Small foundry type 16 1/4 — 16
Monotype 12 1/2 — 14
Lino. and stereotype 12 1/2 — 13 1/4
Electrotype 12 — 13
Hand picked type shells 8 1/4 — 9
Lino. and stereo. dross 6 1/4
Electro. dross 6 1/4

• **NON-FERROUS METALS**

• **ORES AND MINERALS**

• **METALLIC RESIDUES**

• **METAL SCRAP**

• **FERRO ALLOYS**

• **ZINC**

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Is Exclusive Buying Contract Legal?

Federal Trade Commission now ponders that question on basis of complaints from some brokers left in cold . . . Say exclusive contract again grows in use . . . Probe is "exploratory"

Washington anti-trust lawyers are directing a critical eye at the legality of exclusive buying contracts between scrap iron and steel brokers and steel mill consumers. Cooled during the scrap shortage, this interest of the Federal Trade Commission is being rekindled by the marked easing of the scrap supply.

FTC believes the exclusive contract method of buying is once more getting popular. Its attorneys say rigid allocations during the scrap shortage earlier this year dissipated many of the exclusive buying arrangements. For example, the industrial scrap generator who was directed to deliver his scrap to a certain mill could pick his own broker. With the breakdown in the allocations system this choice is now absent.

FTC says it is not off on a chase of the wild goose—but is acting on complaints of some dealers who do not enjoy the protection of exclusive contracts. The probe is still in what FTC calls "the exploratory stage."

Scrap men themselves will offer a discordant medley of opinion on what's right and what's wrong on the problem. It depends on which side of the fence you're on. Mills will say they don't like to fragmentize their scrap orders. Some brokers will argue that the winning of exclusive contracts is free enterprise solidly at work.

Pittsburgh—Most consumers in the district apparently intend to stay out of the market the remainder of this month. Prices remain generally at ceiling, although turnings reportedly are weakening. Cast market is softening, with some dealers willing to ship cupola as charging box cast. Inventories are mountainous, and the largest consumer has stocks of 90 days in the Monongahela Valley, 70 days

overall. This includes 30 days at a new eastern mill. Factors tending to hold up prices include concern over strike damage to blast furnaces, and approaching winter.

Chicago—Scrap was again slowing down last week. Some reported softening of interest in electric furnace grades. Cast went a bit sour. There were few, if any, springboards being offered as an encouragement to collections, and collections seemed relatively slow. Some dealers were being offered lower cast prices, but had enough faith in the market to hold out in most cases. Steelmaking and blast furnace grades of scrap were moving at ceiling, however, and any pessimism regarding the market's future seemed to be more in dealer thinking than in any actual drop in prices.

Philadelphia—Scrap market in this district is still moving quietly along on a fairly even keel. Mills have good inventories on hand but dealers' yards are practically bare. Yard intake remains poor. Buying for the Fairless Works is continuing and is keeping the market strong. Cupola cast is \$1 higher this week.

New York—Blast furnace grades slipped \$2 below ceiling in slow trading here this week. Some dealers said the market was moving along fairly well but others reported there was an added easiness creeping as far as openhearth grades. The cast market held at last week's levels and some dealers were hoping pig iron increases would have a bolstering effect on this basically weak market.

Detroit—Blast furnace grades teetered on the brink of ceiling and needed only the nudge of an offer to send them over the edge. While below-ceiling sales are indicated by the weakness of the market, neither sales or offers could be confirmed. The Detroit market for steelmaking grades is still firm by contrast. Blast furnace scrap moving at the moment is going at ceiling, but is increasingly hard to move.

Cleveland—The market continues strong. Inventories of a large consumer here and another in the Valley are not so robust as those of mills in some other areas. Consequently the betting is for a firm market at ceiling prices at least for the balance of the month. Shipments are slow. Turnings purchases were made by several consumers at ceiling prices.

Birmingham—There was little activity in the scrap market this week, most of the sales of heavy melting going North. Northern mills that will be depending on southern dealers for scrap when cold weather comes are making scattered purchases at ceiling prices, but no large tonnage is moving. One of the larger consumers of cast scrap in the Birmingham district raised its price for No. 1 Cupola Cast to \$46 and stove plate to \$42 and brokers are quoting these prices. Some small consumers have paid up to \$49 for one or two carloads this week.

Cincinnati—Market for openhearth, electric furnace, railroad, and turnings is good. Speculation on how long prices will remain at ceiling usually runs to end of this year. Some brokers feel the market will continue strong even beyond the year end.

West Coast—Shoveling turnings dropped \$8 below ceiling in Los Angeles last week from the previous \$24 to \$20. This is the only West Coast area having crushers to produce these turnings. Others prices continued unchanged with most mills still having heavy inventory.

Boston—The New England scrap market is moving along at a satisfactory pace this week with two more items joining the below ceiling list. These are machine shop turnings at \$22.17 per gross ton and short turnings at \$26.17. Both are \$2 under ceiling.

Buffalo—Slightly easier tendencies developed in cast scrap with prices at ceiling levels on a delivery point basis. Early sales were reported at ceiling prices on a shipping point basis. All other grades are holding firm at control peaks. Mills are buying at those levels. Supplies are again augmented by water receipts of approximately 3000 tons via canal from eastern seaboard.

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WARREN, OHIO; HUBBARD, OHIO

Scrap Prices

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

[illegible]

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	\$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks.....	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Under Ceiling Scrap Prices

Pittsburgh

Machine shop turn.	\$32.00
Mixed bor. and ma. turns.	32.00
Cast iron borings	\$35.00 to 35.50
No. 1 machinery cast ..	52.00
Heavy breakable cast ..	45.00
Malleable	55.00

Chicago

Low phos. forge crops ..	\$50.00	to	\$51.00
Low phos. 3 ft and under	44.00	to	45.00
No. 1 machinery cast ..	48.50	to	49.50
Cupola cast	45.00	to	46.00
Heavy breakable cast....	41.00	to	42.00
Malleable	53.00	to	55.00
Stove plate	42.00	to	43.00
Clean auto cast	48.00	to	50.00
Charging box cast	44.00	to	45.00

Philadelphia Area

Clean cast chem. borings..	\$36.50 to \$37.00
Cupola cast	48.00 to 49.00
Unstripped motor blocks..	41.00 to 42.00
Charging box cast	45.00 to 46.00

Cleveland

Cast iron borings	.....	\$34.00 to \$34.50
Stove plate	.....	45.00 to 46.00
Malleable	.....	54.00 to 55.00

Youngstown

Cast iron borings\$35.00 to \$35.50

Buffalo

No. 1 machinery cast ..	\$49.00 to \$51.00
No. 1 cupola cast	47.00 to 49.00

Birmingham

Shoveling turnings	\$29.00 to \$31.00
Cast iron borings	29.00 to 31.00
No. 1 cupola cast	45.00 to 46.00
Stove plate	41.00 to 42.00
Charging box cast	39.00 to 40.00
Heavy breakable	37.00 to 38.00
Drop broken machinery	44.00 to 45.00
Unstripped motor blocks	37.00 to 38.00

New York

Brokers' Buying prices per gross ton, on cars:

Clean cast chem. borings.....	\$30.00 to \$30.50
Machine shop turnings.....	25.00
Mixed borings and turnings.....	29.00
Shoveling turnings.....	29.00
No. 1 machinery cast.....	48.00 to 50.00
Mixed yard cast.....	43.00 to 44.00
Charging box cast.....	42.00 to 43.00
Heavy breakable cast.....	44.00 to 45.00
Unstripped motor blocks.....	37.00

Boston

Brokers' Buying prices per gross ton, on cars:

Machine shop turnings	\$22.17
Short shoveling turnings	26.17
Mixed cupola cast	\$39.00 to 40.00
Heavy breakable cast	39.00 to 40.00
Stove plate	38.00 to 39.00

Detroit

Brokers' Buying prices per gross ton, on can:

No. 1 cupola cast	\$48.00
Heavy breakable cast ..	\$43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron brake shoes ..	39.00 to 40.00

Cincinnati

Drop broken cast \$51.00 to \$52.00

St. Louis

Unstripped motor blocks	\$38.00
---------------------------------	---------

San Francisco

No. 2 heavy melting	\$31.00
No. 2 bundles	29.00
Machine shop turn	17.00
No. 1 cupola cast	46.00

Los Angeles

No. 2 heavy melting	\$31.00
No. 2 bundles	29.00
Machine shop turn	17.00
Shoveling turnings	20.00
No. 1 cupola cast	50.00

Seattle

No. 2 bundles	\$29.00
No. 1 cupola cast	40.50
Heavy breakable	35.50

Hamilton, Ont.

No. 1 hvy. melting	\$35.50
No. 1 bundles	35.50
No. 2 bundles	35.00
Mechanical bundles	33.50
Mixed steel scrap	31.50
Mixed bor. and turn.	32.50
Rails, remelting	35.50
Rails, rerolling	44.80
Bushelings	30.50
Bush, new fact. prep'd	33.50
Bush, new fact. unprep'd	32.50
Short steel turnings	32.50
Cast scrap	50.00

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LURIA BROTHERS AND COMPANY, INC.

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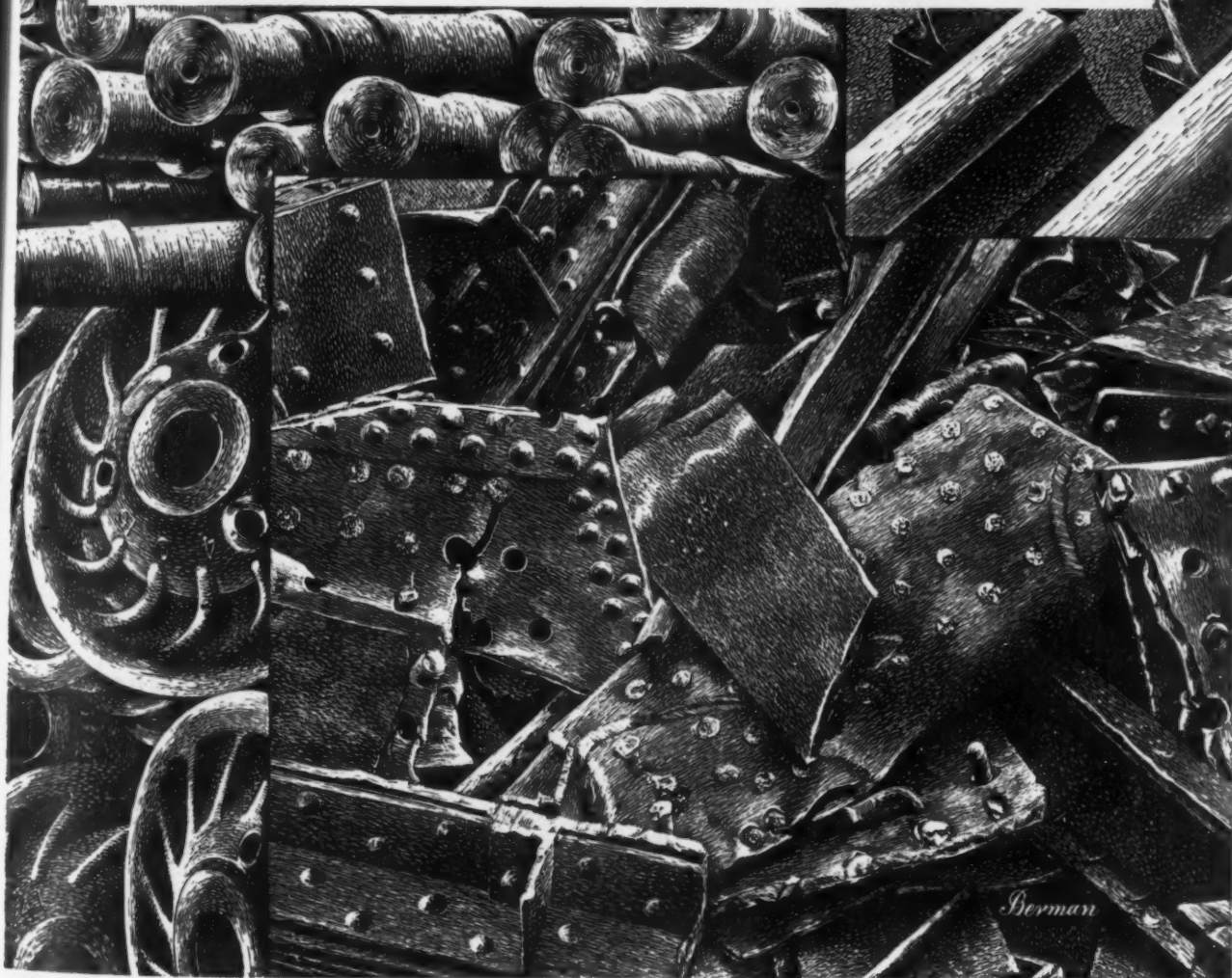
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PLANTS
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CHICAGO, ILLINOIS LOS ANGELES, CAL. ST. LOUIS, MO.
CLEVELAND, OHIO NEW YORK, N. Y. SAN FRANCISCO, CAL.
SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889



Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 9 1952	Sept. 2 1952	Aug. 12* 1952	Sept. 11 1951
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga.)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Stains C-R strip (No. 302)	36.75¢	36.75¢	36.75¢	36.75

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$8.95	\$8.95	\$8.95	\$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50

Bars and Shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	31.50¢	31.50¢	31.50¢	31.50
Wrought iron bars	10.05	10.05	10.05	9.50

Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢

Rails: (per 100 lb)				
Heavy rails	\$3.775	\$3.775	\$3.775	\$3.60
Light rails	4.25	4.25	4.25	4.00

Semifinished Steel: (per net ton)				
Re-rolling billets	\$59.00	\$59.00	\$59.00	\$56.00
Slabs re-rolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	68.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00

Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	3.35

* Revised † Add 4.7 pct.
Composite: (per pound)
Finished steel base price 4.376¢ 4.376¢ 4.376¢ 4.181¢

	Sept. 9 1952	Sept. 2 1952	Aug. 12 1952	Sept. 11 1951
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$60.69	\$60.69*	\$60.69*	\$57.77
Foundry, Valley	55.00	55.00*	55.00*	55.00
Foundry, Southern, Cin'ti	58.93	58.93*	58.93*	55.50
Foundry, Birmingham	51.38	51.38*	51.38*	48.85
Foundry, Chicago†	55.00	55.00*	55.00*	52.50
Basic, del'd Philadelphia	59.77	59.77*	59.77*	56.92
Basic, Valley furnace	54.50	54.50*	54.50*	52.00
Malleable, Chicago†	55.00	55.00*	55.00*	52.50
Malleable, Valley	55.00	55.00*	55.00*	52.50
Charcoal, Chicago	75.84	75.84	75.84	70.54
Ferromanganese	226.25	226.25	226.25	198.25

†The switching charges for delivery to foundries in the Chicago district is \$1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Composite: (per gross ton)				
Pig Iron	\$55.26*	\$55.26*	\$55.26*	\$52.60
*Pig iron price increase retroactive to July 26, 1952.				

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$43.00*	\$43.00*	\$43.00*	\$44.00*
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	42.50*
No. 1 steel, Chicago	41.50*	41.50*	41.50*	42.50*
No. bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos. Youngstown	46.50*	46.50*	46.50*	48.50*
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	49.00†
No. 1 cast, Philadelphia	48.50	47.50	47.50	49.00†
No. 1 cast, Chicago	45.50	45.50	45.50	49.00†

*Basing pt., less broker's fee. †Shipping pt., less broker's fee.

Composite: (per gross ton)				
No. 1 heavy melting scrap	\$42.00	\$42.00	\$42.00	\$43.00

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.75	\$14.75	\$14.75	\$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.21 1/4	\$1.21 1/4	\$1.21 1/4	\$1.00
Zinc, East St. Louis	14.00	14.00	13.75	17.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	20.00	20.00	20.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1) 500 to 1499 lb.

WARE HOUSES		Base price, f.o.b., dollars per 100 lb.												
		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold- Finished	Hot-Rolled A 4815 As Rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4815 As Rolled	Cold-Drawn A 4140 Annealed
Cities	City Delivery Charge													
Baltimore	..... \$ .20	5.81	7.17	8.42	6.42	.....	6.47	6.47	6.41	7.18				
Birmingham	..... 15	5.80	6.65	7.70 ¹	5.80	.....	6.10	5.95	5.80	8.40				
Boston	..... 20	6.51- 6.52	7.36- 8.68	8.59- 8.68	6.55	.....	6.75- 6.80	6.56- 6.75	6.54- 6.61	7.10- 7.46	12.18		13.10	
Buffalo	..... 20	5.80	6.65	8.46	6.21	.....	6.30	6.08	5.90	7.48	12.07		13.07	
Chicago	..... 20	5.81- 5.83	6.65- 6.68	8.05- 8.54	5.83- 5.84	.....	5.95- 6.02	5.95	5.83- 5.91	6.56- 6.92	10.65		12.65	
Cincinnati	..... 15	6.13	6.72	8.52	6.21	.....	6.47	6.42	6.13	7.16	12.07		13.07	
Cleveland	..... 20	5.80- 5.81	6.65- 6.82	8.16- 8.19	6.00- 6.01	.....	6.12- 6.17	6.28- 6.33	5.89- 6.99	6.66- 6.99	10.79		12.79	
Detroit	..... 20	6.00- 6.07	6.81- 6.92	8.34- 8.34	6.13- 6.13	7.99	6.45- 6.47	6.12- 6.45	6.12- 6.30	6.975- 7.21	10.72	11.02	12.72	13.02
Houston	..... 20													
Indianapolis	del'd													
Kansas City	..... 20													
Los Angeles	..... 20	6.58- 6.60	8.45- 8.49	9.75- 10.55	6.74- 6.78		6.66- 6.71	6.60- 6.64	6.57- 6.62	8.36- 8.64	12.05		14.00	
Memphis	..... 10													
Milwaukee	..... 20	5.97- 5.98	6.82- 6.88	8.22	6.01- 6.31		6.12- 6.17	6.12	6.00	6.83- 7.10	10.82		12.82	
New Orleans	..... 15													
New York	..... 30	6.35- 6.62	7.27- 7.41	8.47- 8.68	6.72- 7.15		6.60- 6.78	6.39- 6.70	6.59- 6.79	7.53- 8.05	11.04		13.04	
Norfolk	..... 20													
Philadelphia	..... 25	6.11	7.13	8.35	6.60		6.24	6.17	6.42	7.45	10.79		12.79	
Pittsburgh	..... 20	5.80- 5.81	6.65- 6.81	8.05- 8.45	5.94- 5.97		5.95- 6.12	5.95	5.83	6.66- 6.90	10.65		12.65	
Portland	..... 20	7.60	9.00	9.70	7.60		7.05	7.30	7.35	9.46				
Salt Lake City	..... 20													
San Francisco	..... 15	6.87- 6.90	8.22- 8.46	9.55- 10.05	6.80- 7.08		6.69- 6.90	6.55- 6.80	6.65- 6.66	8.40- 8.70	12.05		14.00	
Seattle	..... 20	7.43	8.46	9.55	7.40		7.19	6.83	7.40	9.31				
St. Louis	..... 20	6.10- 6.11	6.95- 7.11	8.35- 8.48	6.14- 6.48		6.35- 6.40	6.35	6.13	6.96- 7.20	10.95		12.95	
St. Paul	..... 15	6.47	7.31	8.71	6.50		6.61	6.61	6.49	7.32				

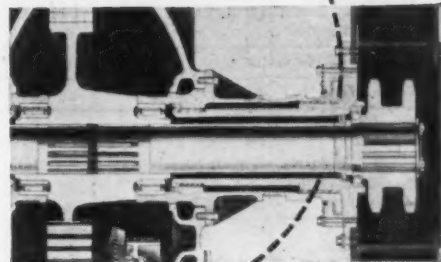
Sept. 11
 1952
 857.77
 52.50
 55.58
 48.88
 52.50
 56.92
 62.00
 52.50
 62.50
 70.56
 186.25
 Chicago
 852.69
 844.00*
 42.58*
 42.58*
 41.13*
 46.80*
 49.00†
 49.00†
 49.00†
 Feb.
 848.00
 814.70
 27.76
 24.80
 24.828
 31.08
 27.50
 26.80
 29.00
 29.88
 24.80
 42.00
 100 lb.
 At Rail
 Cold-Drawn
 Annealed
 13.18
 13.07
 12.85
 13.07
 12.79
 13.02
 14.60
 12.62
 13.04
 12.79
 12.65
 14.60
 12.95
 952



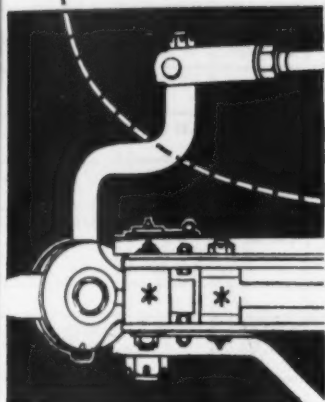
Tough service calls for

**TOUGHER
STEEL . . .**

**the right
REPUBLIC STEEL**



*The drive axle of the
Adams Motor Grader
shown above is Republic
Alloy Steel.*



*Print showing double reverse bend
formed in Adams Grader steering
arm made of Republic Alloy Steel.*

Ever watched a motor grader cut a roadside ditch? Or cut down a bank? There is plenty of shock and stress on the axles and steering arms of this Adams Motor Grader . . . and usually from heavy-handed, heavy-footed operators.

The *right* Republic Alloy Steel Bars were decided on jointly by the metallurgist at J. D. Adams Mfg. Company working with Republic's exclusive 3-Dimension Metallurgical Service. The results include fewer rejected parts within the plant, longer life with fewer field failures, and fewer customer complaints.

The Adams metallurgist talked over his requirements with a Republic Field Metallurgist. Then the Republic field man discussed the problem with two members of the Republic team . . . a Republic Mill Metallurgist and a Republic Laboratory Metallurgist. The alloy selection and the heat-treat procedures they decided on were put into production by Adams.

Perhaps you and your metallurgists face problems of selecting the right alloy to do a certain job best. Or problems of how to shift smoothly to alternate alloy grades. We'll be glad to arrange for a Republic Field Metallurgist to put Republic's *exclusive* 3-Dimension Metallurgical Service to work for you.

REPUBLIC STEEL CORPORATION

Alloy Steel Division • Massillon, Ohio

GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.



Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill in cents per lb., unless otherwise noted. Extras apply.													
STEEL PRICES		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP				
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	
EAST	Bethlehem Pa.					\$76.00 B3			3.90 B3	5.80 B3					
	Buffalo, N. Y.			\$59.00 B3	\$70.50 B3, R3	\$76.00 B3, R3		4.675 B3	3.90 B3	5.80 B3	3.725 B3, R3	5.10 B3	5.70 B3	7.90 B3	
	Claymont Del.														
	Coatesville Pa.														
	Conshehocken Pa.				\$77.50 A2	\$83.00 A2					4.125 A2		5.90 A2		
	Harrisburg Pa.														
	Hartford Conn.														
	Johnstown Pa.			\$59.00 B3	\$70.50 B3	\$76.00 B3			3.90 B3	5.80 B3	3.725 B3				
	Newark N. J.														
	New Haven Conn.											5.60 A5 5.85 D1			
	Phoenixville Pa.								6.10 P2						
	Putnam Conn.														
	Sparrows Pt. Md.										3.725 B3	5.10 B3	5.70 B3	7.90 B3	
	Worcester Mass.														
Trenton N. J.												6.45 R4			
MIDDLE WEST	Alton, Ill.										4.20 L1				
	Ashland, Ky.										3.725 A7				
	Canton-Massillon, Ohio				\$70.50 R3	\$76.00 R3 \$78.60 T5									
	Chicago, Sterling, Ill.			\$59.00 U1	\$70.50 U1, R3, W8	\$76.00 U1, R3, W8		4.675 U1	3.85 U1, W8	5.80 U1	3.725 A1, W8 4.725 N4	5.35 A1			
	Cleveland, Ohio				\$70.50 R3							5.10 A5, J3		7.45 J3	
	Detroit, Mich.	\$56.00 R5	\$57.00 R5		\$73.50 R5	\$79.00 R5					4.025 G3 4.40 M2	5.30 G3 5.45 M2 5.60 D1 6.05 D2	6.30 G3	8.15 G3	
	Duluth, Minn.														
	Gary, Ind. Harbor, Indiana			\$59.00 U1	\$70.50 U1	\$76.00 U1, Y1		4.675 I3	3.85 I3, U1	5.80 I3, U1 6.30 Y1	3.725 I3, U1, Y1	5.35 I3	5.65 I3, U1 6.15 Y1		
	Granite City, Ill.														
	Kokomo, Ind.														
	Middletown, Ohio											5.10 A7			
	Niles, Ohio Sharon, Pa.										4.225 S1	5.80 S1	5.65 S1	7.30 S1	
	Pittsburgh, Pa.	\$54.00 U1	\$57.00 U1	\$59.00 U1, J3	\$70.50 U1, J3	\$76.00 U1	3.55 U1 3.65 J3	4.675 U1	3.85 U1, J3	5.80 U1, J3	3.725 J3, A7 3.975 A3 4.225 S7	5.10 J3, A7 5.45 A3 5.80 B4, S7			
	Portsmouth, Ohio														
WEST	Weirton, Wheeling, Follansbee, W. Va.								4.10 W3		3.825 W3	5.10 W3	6.10 W3	7.95 W3	
	Youngstown, Ohio					\$76.00 Y1, C10	3.55 U1, R3			6.30 Y1	3.725 U1, Y1, R3	5.10 R3, Y1 5.70 C5 5.86 B4	5.65 R3, U1 6.15 Y1	7.30 R3 7.90 Y1	
	Fontana, Cal.	\$81.00 K1	\$83.00 K1	\$78.00 K1	\$89.50 K1	\$95.00 K1			4.45 K1	6.40 K1	4.975 K1	6.75 K1	6.56 K1		
	Geneva, Utah				\$70.50 C7				3.85 C7	5.80 C7					
	Kansas City, Mo.								4.45 S2		4.325 S2				
	Los Angeles, Torrance, Cal.				\$89.50 B2	\$96.00 B2			4.45 C7, B2	6.35 B2	4.475 C7, B2		6.40 B2		
	Minnequa, Colo.								4.30 C6		4.775 C6				
	San Francisco, Niles, Pittsburg, Cal.				\$89.50 B2				4.40 B2 4.56 P9	6.30 B2	4.475 C7, B2		6.40 B2		
	Seattle, Wash.				\$89.50 B2				4.50 B2	6.40 B2	4.725 B2		6.65 B2		
	Atlanta, Ga.										4.275 A8				
SOUTH	Birmingham, Ala. Alabama City, Ala.			\$59.00 T2	\$70.50 T2				3.85 T2, R3	5.80 T2	3.725 T2, R3				
	Houston, Texas		\$65.00 S2		\$78.50 S2	\$84.00 S2			4.25 S2		4.125 S2				

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Hi Str. C.R. Low Alloy	SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE	
	Cold-rolled 16 ga. 6 kvr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box		
													Bethlehem, Pa.
7.90 B3	3.775 B3	4.575 B3				5.675 B3	6.925 B3						Buffalo, N. Y.
													Claymont, Del.
													Coatesville, Pa.
													Conschocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 B3				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
7.90 B3	3.775 B3	4.575 B3	5.075 B3			5.675 B3	6.925 B3	7.775 B3	4.425 B3	\$8.80 B3	\$7.50 B3		Sparrows Pt., Md.
									4.625 A5				Worcester, Mass.
									4.425 R4				Trenton, N. J.
									4.70 L1				Alton, Ill.
	3.775 A7	5.075 A7	4.925 A7										Ashland, Ky.
		5.075 R3											Canton-Massillon, Ohio
	3.775 W8					5.675 U1			4.325 A5, N4 R3				Chicago, Sterling, Ill.
7.45 J3	3.775 R3, J3	4.575 R3, J3	4.925 R3			5.675 R3, J3	6.925 R3, J3		4.325 A5				Cleveland, Ohio
8.15 G3	3.775 G3	4.775 G3				6.225 G3	7.475 G3						Detroit, Mich.
													Duluth, Minn.
	3.775 J3, U1, Y1	4.575 J3, U1, Y1	5.075 J3, U1	4.925 U1	5.475 U1	5.675 J3, U1 6.175 Y1	6.925 J3, U1 7.425 Y1		4.325 Y1	\$8.70 U1, J3, Y1	\$7.40 U1, J3	6.10 U1, Y1	Gary, Ind. Harbor, Indiana
	3.30 G2	5.275 G2	5.50 G2	5.625 G2							\$7.60 G2	6.30 G2	Granite City, Ill.
		5.475 C9											Kokomo, Ind.
	4.575 A7		4.925 A7	5.475 A7									Middletown, Ohio
7.30 S1	3.775 S1					5.675 S1					\$7.40 R3		Niles, Ohio Sharon, Pa.
	3.775 U1, J3, A7 3.925 A1	4.575 U1, J3, A7	5.075 U1	4.925 U1		5.675 U1, J3	6.925 U1, J3	7.625 U1	4.325 A5	\$8.70 U1, J3	\$7.40 U1, J3	6.10 U1	Pittsburgh, Pa.
									4.525 P7				Portsmouth, Ohio
7.95 W3	3.775 W3, W5	4.575 W3, W5	5.075 W3, W5		5.475 W3, W5	6.025 W3	7.275 W3			\$8.70 W3, W5	\$7.40 W3, W5	6.35 W5	Weirton, Wheeling, Follansbee, W. Va.
7.30 R3 7.90 Y1	3.775 U1, R3, Y1	4.575 R3, Y1	5.775 R1	4.925 Y1	6.05 E2	5.675 R3, U1 6.175 Y1	6.925 R3 7.425 Y1	5.65 E2 5.825 R1	4.325 Y1	\$8.70 R3			Youngstown, Ohio
	3.775 K1	5.525 K1				6.625 K1	7.875 K1		5.125 K1				Fontana, Cal.
	3.875 C7												Geneva, Utah
													Kansas City, Mo.
	4.475 C7	5.825 C7						5.575 C7	5.125 C7, B2				Los Angeles, Torrance, Cal.
									4.575 C6				Minneapolis, Colo.
	4.475 C7	5.525 C7	5.825 C7						4.975 C7	\$9.45 C7	\$8.15 C7		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.775 T2, R3	4.575 T2	5.075 T2, R3				5.675 T2		4.925 R3	4.325 T2, R3	\$8.80 T2	\$7.50 T2		Birmingham, Ala. Alabama City, Ala.
									4.725 S2				Houston, Tex.

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
STEEL PRICES		BARS					PLATES				WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's. Brand
EAST	Bethlehem, Pa.				4.675 B3	6.90 B3	5.925 B3					
	Buffalo, N. Y.	3.95 B3,R3	3.95 B3,R3	4.975 B5	4.675 B3,R3	6.90 B3,B5	5.925 B3	3.90 B3			5.95 B3	
	Claymont, Del.							4.35 C4		5.35 C4		
	Coatesville, Pa.							4.35 L4			5.75 L4	
	Conschoocken, Pa.							4.35 A2	4.95 A2		6.20 A2	
	Harrisburg, Pa.							6.50 C3	6.50 C3			
	Hartford, Conn.			5.475 R3		6.45 R3						
	Johnstown, Pa.	3.95 B3	3.95 B3		4.675 B3		5.925 B3	3.90 B3		5.25 B3	5.95 B3	5.225 B3
	Newark, N. J.			5.375 W10		6.35 W10						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.475 W10								
MIDDLE WEST	Sparrows Point, Md.		3.95 B3					3.90 B3		5.25 B3	5.95 B3	5.325 B3
	Worcester, Mass.					6.35 A5						5.525 A5
	Trenton, N. J.											
	Alton, Ill.	4.50 L1										5.45 L1
	Ashland, Ky.							3.90 A7				
	Canton-Massillon	3.95 R3		4.925 R2,R3	4.675 R3 4.72 T5	5.99 T5 6.00 R2,R3						
	Chicago, Sterling, Ill.	3.95 U,W8, R3 4.55 N4	3.95 R3 4.70 N4	4.925 A5,B5 W8,W10	4.675 U1,W8 4.65 R3	6.00 B5,L2, R3,W8,W10 6.05 A5		3.90 R3, U1, W8	4.95 U1	5.25 U1	5.95 U1	5.225 A5, N4,R3 5.325 K2 5.475 W7
	Cleveland, Ohio	3.95 R3	3.95 R3	4.925 A5,C13		6.00 C13 6.05 A5	5.925 R3	3.90 R3,J3	4.95 J3		5.95 R3,J3	5.225 A5, C13, R3
	Detroit, Mich.	4.10 R5 4.30 G3		5.075 R5,P8 5.175 P3	4.825 R5 5.025 G3	6.15 R5,P8 6.20 P3	6.675 G3	4.45 G3			6.90 G3	
	Duluth, Minn.											5.225 A5
	Gary Ind. Harbor, Indiana	3.95 J3, U1, Y1	3.95 J3, U1, Y1	4.925 L2, M5,R3	4.675 J3, U1, Y1	6.00 L2,M5, R3,R5	5.925 J3, U1, 6.425 Y1	3.90 J3, U1, Y1	4.95 J3	5.25 U1	5.95 J3, U1 6.45 Y1	5.325 M4
	WEST	Granite City, Ill.							4.60 G2			
Kokomo, Ind.												5.325 C9
Middletown, Ohio												
Niles, Ohio								4.15 S1		5.70 S1	5.95 S1	
Sharon, Pa.												
Pittsburgh, Pa.		3.95 U1,J3	3.95 U1,J3	4.925 A5,J3, W10,R3,C8	4.675 U1,J3	6.00 W10,C8 6.05 A5	5.925 U1,J3	3.90 U1,J3	4.95 U1,J3	5.25 U1,J3	5.95 U1,J3	5.225 A5, J3
Portsmouth, Ohio												5.625 P7
Weirton, Wheeling, Follansbee, W. Va.		4.10 W3						3.90 W5 4.20 W3				
Youngstown, Ohio		3.95 U1, Y1, R3	3.95 U1, Y1, R3	4.925 Y1	4.675 U1,C10, Y1	6.00 C10, Y1	5.925 U1 6.425 Y1	3.90 U1, Y1, R3			5.95 R3 6.45 Y1	5.225 Y1
Fontana, Cal.		4.65 K1	4.65 K1		5.725 K1		6.975 K1	4.50 K1		6.20 K1	6.55 K1	
Geneva, Utah								3.90 C7			5.95 C7	
SOUTH		Kansas City, Mo.	4.55 S2	4.55 S2		5.275 S2						
	Los Angeles, Torrance, Cal.	4.65 C7,B2	4.65 C7,B2	6.375 R3	5.725 B2		6.625 B2					6.175 C7,B2
	Minnequa, Colo.	4.40 C6	4.75 C6					4.70 C6				5.475 C6
	San Francisco, Niles, Pittsburg, Cal.	4.65 C7,P9 4.70 B2	4.65 C7,P9 4.70 B2				6.675 B2					6.175 C6, C7
	Seattle, Wash.	4.70 B2	4.70 B2				6.675 B2	4.80 B2			6.85 B2	
	Atlanta, Ga.	4.50 A8	4.50 A8									5.475 A8
	Birmingham, Ala.	3.95 T2,R3	3.95 T2,R3				5.925 T2	3.90 T2 R3			5.95 T2	5.225 T2, R3
	Alabama City, Ala.											
	Houston, Tex.	4.35 S2	4.35 S2		5.075 S2			4.30 S2				5.625 S2

Key to Steel Producers

With Principal Offices

- A1 Anne Steel Co., Chicago
 A2 Alas Wood Steel Co., Conshohocken, Pa.
 A3 Allegheny Ludlum Steel Corp., Pittsburgh
 A4 American Clad Metals Co., Carnegie, Pa.
 A5 American Steel & Wire Div., Cleveland
 A6 Angell Nail & Chaplet Co., Cleveland
 A7 Amco Steel Corp., Middletown, O.
 A8 Atlantic Steel Co., Atlanta, Ga.
 B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
 B2 Bethlehem Pacific Coast Steel Corp., San Francisco
 B3 Bethlehem Steel Co., Bethlehem, Pa.
 B4 Blair Strip Steel Co., New Castle, Pa.
 B5 Blas & Laughlin Inc., Harvey, Ill.
 C1 California Cold Rolled Steel Corp., Los Angeles
 C2 Carpenter Steel Co., Reading, Pa.
 C3 Central Iron & Steel Co., Harrisburg, Pa.
 C4 Claymont Products Dept., Claymont, Del.
 C5 Cold Metal Products Co., Youngstown
 C6 Colorado Fuel & Iron Corp., Denver
 C7 Columbia-Geneva Steel Div., San Francisco
 C8 Columbia Steel & Shifting Co., Pittsburgh
 C9 Continental Steel Corp., Kokomo, Ind.
 C10 Copperweld Steel Co., Glassport, Pa.
 C11 Crucible Steel Co. of America, New York
 C12 Cumberland Steel Co., Cumberland, Md.
 C13 Cuyahoga Steel & Wire Co., Cleveland
 D1 Detroit Steel Corp., Detroit
 D2 Detroit Tube & Steel Div., Detroit
 D3 Driver Harris Co., Harrison, N. J.
 E1 Eastern Stainless Steel Corp., Baltimore
 E2 Empire Steel Co., Mansfield, O.
 F1 Fifth Sterling Steel & Carbide Corp., McKeesport, Pa.
 F2 Fitzsimmons Steel Corp., Youngstown
 F3 Follansbee Steel Corp., Follansbee, W. Va.
 G1 Globe Iron Co., Jackson, O.
 G2 Granite City Steel Co., Granite City, Ill.
 G3 Great Lakes Steel Corp., Detroit
 H1 Hanna Furnace Corp., Detroit
 I1 Ingersoll Steel Div., Chicago
 I2 Inland Steel Co., Chicago
 I4 Interlake Iron Corp., Cleveland
 J1 Jackson Iron & Steel Co., Jackson, O.
 J2 Jumbo Steel Corp., Washington, Pa.
 J3 Jones & Laughlin Steel Corp., Pittsburgh
 J4 Judyn Mfg. & Supply Co., Chicago
 K1 Kaiser Steel Corp., Fontana, Cal.
 K2 Keystone Steel & Wire Co., Peoria
 K3 Koppers Co., Granite City, Ill.
 L1 Laclede Steel Co., St. Louis
 L2 La Salle Steel Co., Chicago
 L3 Lone Star Steel Co., Dallas
 L4 Lukens Steel Co., Coatsville, Pa.
 M1 Mahoning Valley Steel Co., Niles, O.
 M2 McLouth Steel Corp., Detroit
 M3 Moore Tube & Mfg. Co., Sharon, Pa.
 M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
 M5 Mmamach Steel Co., Inc., Hammond, Ind.
 M6 Mystic Iron Works, Everett, Mass.
 N1 National Supply Co., Pittsburgh
 N2 National Tube Co., Pittsburgh
 N3 Niles Rolling Mills Co., Niles, O.
 N4 Northwestern Steel & Wire Co., Sterling, Ill.
 O1 Oliver Iron & Steel Co., Pittsburgh
 P1 Page Steel & Wire Div., Monaca, Pa.
 P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
 P3 Pilgrimage Drawn Steel Div., Plymouth, Mich.
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh

- P6 Pittsburgh Steel Co., Pittsburgh
 P7 Portsmouth Div., Detroit Steel Corp., Detroit
 P8 Plymouth Steel Co., Detroit
 P9 Pacific States Steel Co., Niles, Cal.
 R1 Reeves Steel & Mfg. Co., Dover, O.
 R2 Reliance Div., Easton Mfg. Co., Massillon, O.
 R3 Republic Steel Corp., Cleveland
 R4 Roehling Sons Co. (John A.), Trenton, N. J.
 R5 Rotary Electric Steel Co., Detroit
 S1 Sharon Steel Corp., Sharon, Pa.
 S2 Sheffield Steel Corp., Kansas City
 S3 Shenango Furnace Co., Pittsburgh
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.
 S5 Sloan Sheffield Steel & Iron Co., Birmingham
 S6 Standard Forging Corp., Chicago
 S7 Stanley Works, New Britain, Conn.
 S8 Superior Drawn Steel Co., Monaca, Pa.
 S9 Superior Steel Corp., Carnegie, Pa.
 S10 Sweet's Steel Co., Williamsport, Pa.
 S11 Seidellhuber Steel Rolling Mills, Seattle

- T1 Tanawanda Iron Div., N. Tanawanda, N. Y.
 T2 Tennessee Coal & Iron Div., Birmingham
 T3 Tennessee Products & Chem. Corp., Nashville
 T4 Thomas Steel Co., Warren, O.
 T5 Timken Steel & Tube Div., Canton, O.
 T6 Tremont Nail Co., Wareham, Mass.

- U1 United States Steel Co., Pittsburgh
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

- W1 Wallingford Steel Co., Wallingford, Conn.
 W2 Washington Steel Corp., Washington, Pa.
 W3 Weirton Steel Co., Weirton, W. Va.
 W4 Wheatland Tube Co., Wheatland, Pa.
 W5 Wheeling Steel Corp., Wheeling, W. Va.
 W6 Wickwire Spencer Steel Div., Buffalo
 W7 Wilson Steel & Wire Co., Chicago
 W8 Wisconsin Steel Co., S. Chicago, Ill.
 W9 Woodward Iron Co., Woodward, Ala.
 W10 Wyckoff Steel Co., Pittsburgh

- Y1 Youngstown Sheet & Tube Co., Youngstown

BOILER TUBES

S per 100 ft. carload lots, cut 10 to 24 ft. F.a.b. Mill	Sized		Seamless		Elec. Weld	
	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	23.93	28.14	23.19	27.28
	2 1/2	12	32.17	37.83	31.19	36.67
	3	12	35.78	42.11	34.69	40.82
	3 1/2	11	44.72	52.65	43.36	51.05
	4	10	55.52	65.31	53.83	63.32
National Tube	2	13	22.81	27.94	22.23	27.28
	2 1/2	12	31.28	38.31	30.51	36.67
	3	12	35.87	43.93	34.90	40.82
	3 1/2	11	42.56	52.12	41.05	48.82
	4	10	54.02	66.16	52.51	63.32
Pittsburgh Steel	2	13	25.50	30.51	24.51	29.52
	2 1/2	12	32.16	39.19	31.17	36.67
	3	12	36.87	44.93	35.88	40.82
	3 1/2	11	43.76	53.32	42.77	48.82
	4	10	55.54	67.68	54.55	63.32

C-R SPRING STEEL

Cents Per Lb. F.a.b. Mill	CARBON CONTENT				
	0.28- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06- 1.35
Bridgeport, Conn. S7	.....	.....	.....	.....	.....
Carnegie, Pa. S9	.....	.....	.....	.....	.....
Cleveland A5	5.10	7.30	8.25	10.20	12.50
Detroit D1	6.45	7.50	8.10	10.20	12.50
New Castle, Pa. B4	5.80	7.65	8.25	10.20	12.50
New Haven, Conn. D1	6.70	7.60	8.20	10.20	12.50
Sharon, Pa. S1	5.80	7.65	8.25	10.20	12.50
Trenton, N. J. R4	.....	7.95	8.55	10.50	12.80
Weirton, W. Va. W3	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. A5	5.40	7.60	8.55	10.50	12.80
Youngstown C5	.....	7.65	8.25	10.20	12.50

STAINLESS STEELS

Base price, cents per lb., f.a.b. mill. Add 4.7 pct

Product	301	302	303	304	316	321	347	410	416	430
Ingot, re-rolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, re-rolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	28.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	34.50	37.00	30.00
Strip, hot-rolled	28.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2; (type 316 add 4.5¢) J3; Baltimore, Md., E1; Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, Ind., J4; Lockport, N. Y., R6.

Strip: Midland, Pa., C11; Cleveland, Ind., A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; (type 316 add 4.5¢) W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, Mich., M3; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, Pa., C5; Lockport, N. Y., S4; Sharon, Pa., S1 (type 301 add 1/4¢); Butler, Pa., A7; Wallingford, Conn., W7.

Bars: Baltimore, Md., A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, Ill., U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, Ill., A5; Lockport, N. Y., S4; Canton, O., T3; Ft. Wayne, Ind., J4.

Wires: Waukegan, Ill., A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind., J4; Harrison, N. J., D3; Baltimore, Md., A7; Dunkirk, N. Y., A3; Monaca, Pa., P1; Syracuse, N. Y., C11; Bridgeville, Pa., U2.

Structurals: Baltimore, Md., A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, N. Y., C11.

Plates: Brackenridge, Pa., A3 (type 416 add 1/4¢); Butler, Pa., A7; Chicago, Ill., U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Lockport, N. Y., S4; Middletown, Pa., A7; Washington, Pa., J2; Cleveland, Massillon, R3.

Forged discs, die blocks, rings: Pittsburgh, Pa., C11; Syracuse, N. Y., C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, Md., A7; Washington, Pa., J2; McKeesport, Pa., F1; Massillon, Canton, O., R3; Watervliet, N. Y., A3; Pittsburgh, Pa., C11; Syracuse, N. Y., C11.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

Base discounts f.a.b. mills. Base price about \$290 per net ton.

	BUTTWELD														SEAMLESS					
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2-3 in.		3 1/2-4 in.	
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. B3	30.5	8.25	33.5	12.25	35.5	15.75	36.5	16.25	37.0	17.25	37.5	17.75	38.0	18.25						
Youngstown R3	32.5	10.25	35.5	14.25	38.0	17.75	39.0	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Fontana K1	21.0	+1.25	24.0	2.75	26.5	6.25	27.0	6.75	27.5	7.75	28.0	8.25	28.5	8.75						
Pittsburgh J3	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	24.0	2.25	27.0	5.75	29.0	7.75
Pittsburgh N2	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Alton, Ill. L1	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Sharon M3	32.5	9.25	35.5	13.25	38.0	16.25	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.25						
Pittsburgh N1	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0		27.0		29.0	
Wheeling W5	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Wheeling W4	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75						
Youngstown Y1	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Indiana Harbor Y1	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Lorain N2	32.5	15.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
EXTRA STRONG																				
PLAIN ENDS																				
Sparrows Pt. B3	30.25	9.5	34.25	13.5	36.25	17.0	36.75	17.5	37.25	18.5	37.75	19.0	38.25	19.5						
Youngstown R3	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Fontana K1	20.75		24.75		26.75		27.25		27.75		28.25		28.75							
Pittsburgh J3	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	23.75	2.0	27.75	6.5	31.25	10.0
Pittsburgh N2	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0
Alton, Ill. L1	29.25	8.5	33.25	12.5	35.25	16.0	35.75	16.5	36.25	17.5	36.75	18.0	37.25	18.5						
Sharon M3	32.25	10.5	36.25	14.5	38.25	17.5	38.75	18.0	39.25	18.5	39.75	19.0	40.25	19.5						
Pittsburgh N1	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75		27.75		31.25	
Wheeling W5	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Wheeling W4	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0						
Youngstown Y1	32.25	11.5	36.25	15.5	37.75	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	22.5	23.75	4.5	27.75	8.5	31.25	12.0
Indiana Harbor Y1	31.25	10.5	35.25	14.5	37.25	17.5	37.75	18.5	38.25	19.5	38.75	20.0	39.25	20.5						
Lorain N2	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	

Galvanized discounts based on zinc, on 44 per lb. East St. Louis. For each 1¢ change in zinc, discounts vary as follows: $\frac{1}{4}$ in., $\frac{3}{4}$ in., and 1 in., 1 pt.; $1\frac{1}{2}$ in., $1\frac{3}{4}$ in., 2 in., $2\frac{1}{2}$ in., 3 in., $\frac{1}{2}$ pt. Calculate discounts on 44 per lb. of zinc, i.e., if zinc is 16.514 to 17.590 per lb. use 17¢. Jones & Laughlin discounts apply only when zinc changes 1¢. Threads only butt welded and seamless, 1 pt. higher discount. Plain ends, butt welded and seamless, 3 in. and under, $3\frac{1}{2}$ pts. higher discount. Battwell Jobbers' discount, 1 pt. St. Louis zinc price new 14.0¢.

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50 to \$15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$17.50 to \$18.00
Foundry, oven	some
Buffalo, de'd	\$26.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, de'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.35
Cleveland, de'd	25.72
Cincinnati, de'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, de'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length	F.o.b. Mill Cents Per Lb	Armature	Elec.	Motor	Dynamo	Transl. 72	Transl. 65	Transl. 58
Beech Bottom <i>W5</i>		7.35	7.85	9.10	9.90	10.45	11.00	11.70
Brackenridge <i>A3</i>		7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City <i>G7</i>			8.55	9.80				
Ind. Harbor <i>B3</i>		7.35	7.85	9.10				
Manxfield <i>E2</i>		7.35	7.85	9.10	9.90			
Niles, O. <i>N3</i>		7.35	7.85					
Vandergrift <i>U1</i>		7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. <i>R3</i>		7.35	7.85	9.10				
Zanesville <i>A7</i>		7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	\$105.30 to \$109.00
6 to 24-in., del'd N.Y....	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$123.00 to \$130.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

MERCHANT WIRE PRODUCTS

Standard & Coated Nails
Woven Wire
Fence 9-15% gal.
Fence Posts
Single Loop Bala Ties
Twisted Barbless Wire
Gal. Barbed Wire
March. Wire Ann'd
March. Wire Gal.*

PIG IRON

Producing Point		Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem B3	56.50	57.00	57.50	58.00	.....	.....	.....	.....
Birmingham R3	50.88	51.38	.....	.....	.....	.....	.....	.....
Birmingham W9	50.88	51.38	.....	.....	.....	.....	.....	.....
Birmingham S5	50.88	51.38	.....	.....	.....	.....	.....	.....
Buffalo R3	54.50	55.00	55.50	.....	.....	.....	.....	.....
Buffalo H1	54.50	55.00	55.50	.....	.....	.....	66.75	.....
Buffalo W6	54.50	55.00	55.50	.....	.....	.....	.....	.....
Chicago 14	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Cleveland A5	54.50	55.00	55.00	55.50	59.50	.....	.....	.....
Cleveland R3	54.50	55.00	55.00	.....	.....	.....	.....	.....
Dalingerfeld, Tex. L3	50.50	51.00	51.00	.....	.....	.....	.....	.....
Duluth 14	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Erie 14	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Everett, Mass. M6	.....	59.75	60.25	.....	.....	.....	.....	.....
Fontana K1	60.50	61.00	.....	.....	.....	.....	.....	.....
Geneva, Utah C7	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Granite City, Ill. K3	56.40	56.90	57.40	.....	.....	.....	.....	.....
Hubbard, Ohio Y1	54.50	55.00	55.00	.....	.....	.....	.....	.....
Ironfronton Utah C7	54.50	55.00	.....	.....	.....	.....	.....	.....
Jackson, Ohio J1, G1	.....	.....	.....	.....	.....	.....	65.50	.....
Lyle, Tenn. T3	.....	.....	.....	.....	.....	.....	.....	66.00
Minnequa C6	56.50	57.50	57.50	.....	.....	.....	.....	.....
Monessen P6	56.50	.....	.....	.....	.....	.....	.....	.....
Neville Island P4	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Pittsburgh U1	54.50	.....	.....	55.50	.....	.....	.....	.....
Sharpsville S3	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Steelton B3	56.50	57.00	57.50	58.00	62.50	.....	.....	.....
Swedeland A2	58.50	59.00	59.50	60.00	.....	.....	.....	.....
Toledo 14	54.50	55.00	55.00	55.50	.....	.....	.....	.....
Tray, N. Y. R3	56.50	57.00	57.50	.....	62.50	.....	.....	.....
Youngstown Y1	54.50	55.00	55.00	55.50	.....	.....	.....	.....
N. Tonawanda, N. Y. T1	.....	55.00	55.50	.....	.....	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add \$1.50 per net ton for each 0.50 pct silicon over base (0.01 to 0.50 pct) up to 17 pct. \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferroalloy prices are \$1 over comparable silvery iron. †

F.a.b. Mill	Col	Cal	Col	Cal	Col	Cal	d/b.	d/b.
Alabama City R3.	118	135		132		144	6.975	3.125
Alliquippa, Pa. J3.	127	141				148	6.975	3.025
Atlanta A6.	130	140		135		149	3.325	4.675
Bartenville K2.	127	138	140	132	147	147	6.975	4.025
Buffalo W6.							6.975	4.025
Cleveland A6.								
Cleveland A5.								
Crawfordsv. M4.	130	140		134		149	6.175	3.825
Demora, Pa. A5.	127	133		132		142	6.975	3.025
Duluth A5.	127	133		132		142	6.975	3.025
Fairfield, Ala. T7.	127	133		132		142	6.975	3.025
Houston S2.	135	147				156	4.975	4.025
Johnstn., Pa. B3.	127		148		149		6.375	
Joliet, Ill. A5.	127	133		132		142	6.975	3.025
Kokomo, Ind. C9.			142				6.175	4.025
Los Angeles B7.							7.025	
Kansas City S2.	130			144		146	6.975	3.025
Minneapolis C6.	123	146	138	137		153	6.325	4.675
Monessen P6.								
Moline, Ill. R3.				136				
Pittsburg, Cal. C7.	146	156		156	162	162	7.025	3.975
Portsmouth P7.	132						6.47	
Rankin, Pa. A5.	127	133				142	6.975	4.025
S. Chicago R3.	118	135	140	132		144	6.975	3.025
S. San Fran. Co.				156		167	6.025	4.975
Sparrows Pt. B3.	129			134	151		6.475	
Stirling, Ill. N6.	127	136		132	147		6.975	4.025
Struthers, O. Y1.							6.975	4.025
Terrance, Cal. C7.	147						7.025	
Worcester A5.	133						6.375	4.625
Williamport, Pa. S10.								

* Alabama City and So. Chicago don't include zinc extra.
† Alabama City, So. Chicago, and Minnogo, add 6¢ per 100 lb.

Miscellaneous Prices— BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh,
Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pot Off List

	Less Keg.	Reg.	Less Keg.	Hvy. K.
1/4 in. & smaller.	15	23 1/4	15	23 1/4
5/16 in. & 3/8 in.	12	25	6 1/4	31
3/4 in. to 1 1/2 in.	9	23	1	16 1/4
Inclusive	7 1/4	22	1	16 1/4

Nuts, Hot Pressed—Hexagon

	Less Keg.	Reg.	Less Keg.	Hvy. K.
1/4 in. & smaller.	26	37	22	34
5/16 in. & 3/8 in.	16 1/4	29 1/4	6 1/4	21
3/4 in. to 1 1/2 in.	12	25	2	17 1/4
Inclusive	8 1/4	23	2	17 1/4

Nuts, Cold Punched—Hexagon

	Less Keg.	Reg.	Less Keg.	Hvy. K.
1/4 in. & smaller.	26	37	22	34
5/16 in. & 3/8 in.	23	35	17 1/4	30 1/4
3/4 in. to 1 1/2 in.	19 1/4	31 1/4	12	25
Inclusive	8 1/4	23	2	17 1/4

Nuts, Semi-Finished—Hexagon

	Less Keg.	Reg.	Less Keg.	Hvy. K.
1/4 in. & smaller.	35	45	28 1/4	29 1/4
5/16 in. & 3/8 in.	23	35	17 1/4	30 1/4
3/4 in. to 1 1/2 in.	24	36	15	28 1/4
Inclusive	13	26	8 1/4	23
Light				
7/16 in. & smaller.	35	45		
er	28 1/4	39 1/4		
1/4 in. thus 3/8 in.	28 1/4	39 1/4		
3/4 in. to 1 1/2 in.	26	37		
Inclusive				

Stove Bolts

Pot Off List

Packaged, steel, plain finished.	48—10
Packaged, plate finish	31—10
Bulk, plain finish	62*
*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price ap- plies.	
**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.	

Rivets

Base per 100 lb

1/2 in. & larger	\$7.85
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Cap and Set Screws

(In bulk)

Pot Off List

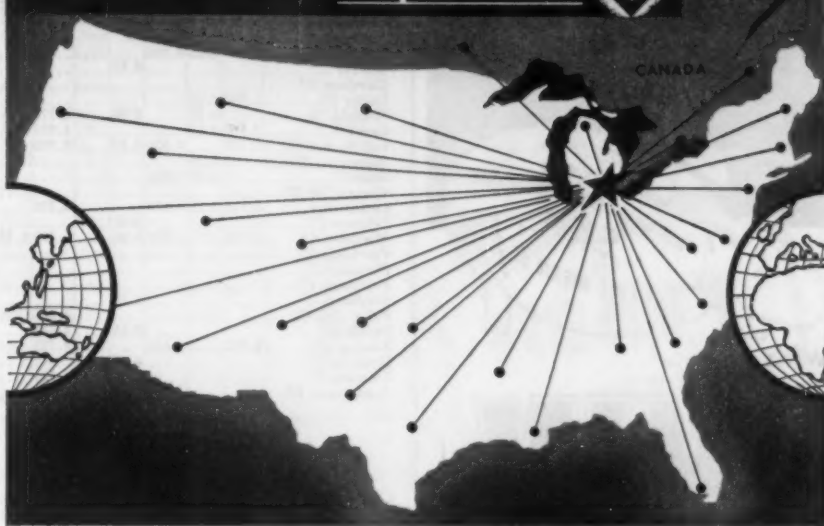
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 3/8 in. x 6 in., SAE 1020, bright	54
1/4 in. thru 1 in. up to & including 6 in.	48
3/4 in. thru 1 1/2 in. x 6 in. & shorter	46
high C double heat treat	41
1/4 in. thru 1 in. up to & including 6 in.	35
Milled studs	16
Flat head cap screws, listed sizes ...	24
Fillister head cap, listed sizes	24
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pot Off List

	Less Case	C.
1/4 in. & smaller x 6 in. & shorter	15	28 1/4
5/16 in. & 3/8 in. x 6 in. & shorter	18 1/4	30 1/4
3/4 in. & larger x 6 in. & shorter	17 1/4	29 1/4
All diam. longer than 6 in. ...	14	27 1/4
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	

Weldimatic means Fully Automatic



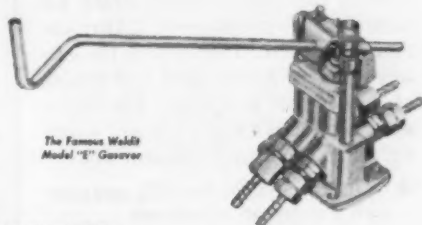
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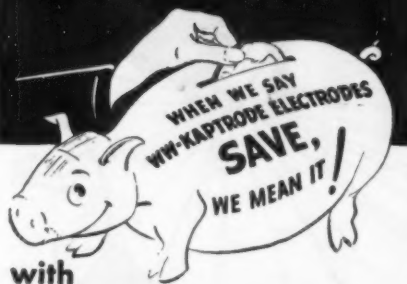
The thousands of purchasing executives, production chiefs, and engineers, all potential **BUYERS** of your products are among the readers of *Iron Age*. Your advertisement here can pave the way for your salesmen throughout the metalworking industry.

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WW[®] KAPTRODE*

*Trade Mark

SPOT WELDING ELECTRODES

The new WW Kaptrode Electrode is a small cap type electrode which fits into a semi-permanent Kaptrode Adapter Shank. This in turn fits into any standard Morse taper type holder of appropriate taper size. The entire assembly makes a highly efficient water-tight and electrically-efficient unit.

- **COPPER SAVINGS**—75% and more with widespread, careful use.
- **ELECTRODE COST SAVINGS**—20% and up in ordinary shop operations; careful operators save as high as 50%.
- **INVENTORY SAVINGS**—30% and up; only small supply of shanks needed; electrodes are interchangeable; one shank with proper care should outlast ten or more.
- **TIME SAVINGS**—Kaptrodes quickly, easily inserted and removed.
- **MAINTENANCE SAVINGS**—in majority of cases, the Adapter Shank may be left permanently in the holder, saving maintenance and changeover time.

For the toughest electrode-consuming job in your plant, order a supply of WW-Kaptrode Electrodes NOW!

WW[®]

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Miscellaneous Prices

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer U1.....	3.775	4.25	4.925	6.65			
Chicago R3.....							
Cleveland R3.....	3.775	4.25					
Ensley T2.....		4.25		6.65		4.775	
Fairfield T2.....	3.775	4.25				4.775	
Gary U1.....	3.775	4.25	4.925	6.65		4.775	
Ind. Harbor B3.....		4.25					
Johnstown B3.....		4.25	4.925				
Joliet U1.....		4.25	4.925				
Kansas City S2.....							
Lackawanna B3.....	3.775	4.25	4.925			4.775	
Lebanon B3.....				6.65			
Minneapolis C6.....	3.775	4.75	4.925	6.65		4.775	9.85
Pittsburgh R3.....							
Pittsburgh O1.....							
Pittsburgh P3.....				6.65			
Pittsburgh J3.....						4.925	
Pitt. Cal. C7.....				7.15		4.925	
Seattle B2.....						4.775	
Steelton B3.....	3.775		4.925	6.65			
Struthers Y1.....						4.925	
Torrance C7.....							
Youngstown R3.....				6.65			

TOOL STEEL

F.o.b. mill
Add 4.7 pct

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.505
18	4	1	—	5	\$2.13
18	4	2	—	—	\$1.65
1.5	4	1.5	8	—	\$1.0¢
6	4	2	8	—	\$6.5¢
High-carbon chromium					63.5¢
Oil hardened manganese					35¢
Special carbon					\$3.5¢
Extra carbon					27¢
Regular carbon					23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct

Seamless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. L4.....	*29.5	
Washington, Pa. J2.....	*29.5	
Claymont, Del. C4.....	*28.00	
Conschocken, Pa. A2.....		*27.50
New Castle, Ind. J2.....	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. L4.....	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. L4.....	40.5	
Monel-carbon		
10 pct Coatesville, Pa. L4.....	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. A4.....		77.00
Luminized steel sheets, hot dip, Butler, Pa. A7.....		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2 1/4	24, 30	23.15
2	24, 30	25.36
CARBON		
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

FLUORS PAR

Washed gravel, f.o.b. Rosclair, Ill.
Price, net ton; Effective CaF₂ content:
70% or more \$43.00
60% or less 40.00

BROOKS

SINCE 1876

Complete Service FOR EVERY INDUSTRIAL PLANT

BOILER WATER TREATMENT

Constant laboratory control and analysis to meet existing and changing boiler room conditions. Formulas include both powder and liquid treatments.

WATER LINE TREATMENTS

Laboratory developed to meet existing conditions in the industrial or institutional application. Prevents pipe line deposits, scale and corrosion in the system.

COOLING WATER SYSTEM TREATMENTS

Another series of laboratory-developed treatments that primarily reduce scale, increase thermal efficiency and prevent iron stains on enamel and similar material.

BRINE SYSTEM TREATMENTS

System treatments, individually laboratory-developed to meet the most difficult algae and corrosion problem and to provide maximum efficiency to the installation.

WASTE WATER TREATMENTS

Whether the problem involves spent acids, food wastes, plating bath wastes or whether water control is mandatory by Federal, State or Municipal laws, our Service Engineers will gladly cooperate in the solution of your problem.

ZEOLITE SOFTENER TREATMENTS

Scientific combination of cleansing and wetting agents that penetrate the minute pores of Zeolite, loosen and remove silt particles, oily films and other contaminations.

FIRE SCALE & CARBON

DISINTEGRATORS

An improved laboratory-development that expedites the removal of fire scale and carbon with a minimum loss of boiler room time and efficiency.

FUEL-OIL TREATMENTS

Both our laboratory tests and field use prove that these formulas keep tanks and supply lines clean and moisture-free; eliminate carbon on injection nozzles and upper heads; keep exhaust ports open; and add months between overhauls.

INDUSTRIAL ODOR CONTROL TREATMENT

Another recent laboratory development that is widely accepted in the Food Processing, Meat, Poultry, and kindred industries. Provides complete elimination of distasteful odors both in and outside the plant.

INDUSTRIAL DEGREASERS

Laboratory-developed to meet the most rigid requirements of the ferrous and non-ferrous industries,—electroplating and others. Used successfully in the hot or cold process, water and chemical soluble, with chemical as well as physical detergent action.

INDUSTRIAL DETERGENTS

In this field Brooks provides many standard and special formulas for general maintenance, bottle cleaning machines and, in fact, for every industrial job.

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This method of engineering special handling systems, at no extra engineering cost, is standard practice with Reading. For full details on how you can use it to reduce handling costs and modernize operations, call in a Reading Engineer. There is no obligation.



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Miscellaneous Prices—

REFRACTORIES

Fire Clay Brick *Carloads, per 1000*
First quality, Ill. Ky., Md., Mo., Ohio, Pa.
(except Salina, Pa., add \$5)\$94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (ex-
cept Salina, Pa., add \$1.50) 13.75

Silica Brick
Mt. Union, Pa., Ensley, Ala.\$94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens,
Tex., Chicago 111.10
Silica cement, net ton, bulk, East-
ern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays,
Pa. 18.70
Silica cement, net ton, bulk, Ensley,
Ala. 17.00
Silica cement, net ton, bulk, Chi-
cago District 17.00
Silica cement, net ton, bulk, Utah
and Calif. 24.70

Chrome Brick *Per Net Ton*
Standard chemically bonded Balt.,
Chester\$82.00

Magnesite Brick
Standard, Baltimore\$104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite *St. % in. grains*
Domestic, f.o.b. Baltimore
in bulk fines removed\$62.70
Domestic, f.o.b. Chewelah, Wash.,
in bulk 26.30
in sacks 41.80

Dead Burned Dolomite
F.o.b. producing points in Pennsyl-
vania, West Virginia and Ohio
per net ton, bulk Midwest, add
10¢; Missouri Valley, add 20¢...\$13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered
lower Lake ports. 1952 prices not yet es-
tablished. 1951 prices were:

Gross Ton
Old range, bessemer\$2.70
Old range, nonbessemer 2.55
Menab, bessemer 2.45
Menab, nonbessemer 2.30
High phosphorus 2.30

After adjustments for analysis, prices
will be increased or decreased as the case
may be for increases or decreases after
Dec. 2, 1950, in Lake vessel rates, upper
Lake rail freights, dock handling charges
and taxes thereon.

METAL POWDERS

*Per pound, f.o.b. shipping point, in ton
lots, for minus 100 mesh.*

Swedish sponge iron c.l.f. 10.9¢
New York, ocean bags, ...
Canadian sponge iron, del'd,
in East 10.00¢

Domestic sponge iron, 98+%,
Fe, carload lots 15.5¢ to 17.0¢

Electrolytic iron, annealed,
99.5+%, Fe 44.0¢

Electrolytic iron, unannealed,
minus 325 mesh, 99+%, Fe 60.0¢

Hydrogen reduced iron, mi-
nus 300 mesh, 98+%, Fe. 63.0¢ to 80.0¢

Carbonyl iron, size 5 to 10
micron, 98%, 99.8+%, Fe. 83.0¢ to 11.48

Aluminum 31.5¢

Brass, 10 ton lots 30.00¢ to 33.35¢

Copper, electrolytic, 10.75¢ plus metal value

copper, reduced ... 10.00¢ plus metal value

Cadmium, 100-199 lb. 95¢ plus metal value

Chromium, electrolytic, 99%
min., and quantity, del'd\$3.50

Lead 7.5¢ to 12.0¢ plus metal value

Manganese 57.0¢

Molybdenum, 99%\$2.75

Nickel, unannealed 88.0¢

Nickel, annealed 95.0¢

Nickel, spherical, unannealed 92.0¢

Silicon 38.5¢

Solder powder, 7.0¢ to 9.0¢ plus met. value

Stainless steel, 302\$3.00¢

Stainless steel, 316\$1.10

Tin 14.00¢ plus metal value

Tungsten, 99% (65 mesh) ... \$6.00

Zinc, 10 ton lots 23.0¢ to 30.5¢

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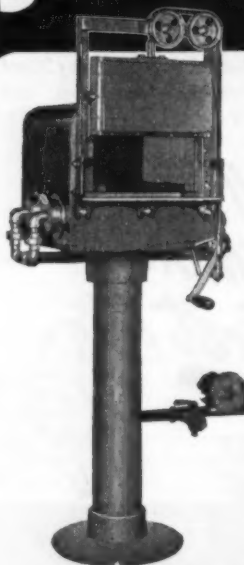
For dependability, safety and extremely simple operation, the DEUTSCHE NILES offers many advantages. Speeds and feeds are easily controlled. All levers, manual and rapid traverse settings are controlled from the operator's position. Idle time is reduced to a minimum. High speed steels and carbide tools can be used. It is possible to use the full power of the machine without overloading.

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For temperatures 1800° to 2400° F. \$325.00
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Ferroalloy Prices

Ferrochromes

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)
0.06% C ... 30.50 0.20% C ... 29.50
0.10% C ... 30.00 0.50% C ... 29.50
0.15% C ... 29.75 1.00% C ... 29.50
2.00% C ... 28.75
65-69% Cr, 4-9% C ... 28.75
63-66% Cr, 4-6% C, 6-9% Si ... 22.00

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-4% Si, 4-6% Mn, 4-6% C.
Carloads ... 31.50
Ton lots ... 31.75
Less ton lots ... 31.75
Low carbon type: 62-66% Cr, 4-4% Si, 4-6% Mn, 1.25% max. C.
Carloads ... 31.75
Ton lots ... 31.75
Less ton lots ... 31.50

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.
0.10% max. C ... \$1.14
0.50% max. C ... 1.10
9 to 11% C ... 1.00

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.)
Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 3-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.
Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.
30-33% Ca, 60-65% Si, 3.00% max. Fe.
Carloads ... 19.00
Ton lots ... 22.10
Less ton lots ... 23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads ... 20.90
Ton lots ... 22.20
Less ton lots ... 23.20

CM5Z

Contract price, cents per lb of alloy, delivered.
Alloy 4: 45-49% Cr, 4-6% Mn, 13-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
Ton lots ... 20.75
Less ton lots ... 22.00

5MZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, 3/4 in. x 12 mesh.
Ton lots ... 17.50
Less ton lots ... 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.
Ton lots ... 16.50
Less ton lots ... 17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed ... 18.00
Ton lots to carload packed ... 19.00
Less ton lots ... 20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va. ... 22.50
Ashtabua, O. ... 22.50
F.o.b. Johnstown, Pa. ... 22.50
F.o.b. Sheridan, Pa. ... 22.50
F.o.b. Etina, Clairton, Pa. ... 22.50
Add \$2.80 for each 1% above 82% Mn, subtract \$2.80 for each 1% below 78% Mn.

Briquets—Cents per pound of briquet delivered, 66% contained Mn.
Carload, bulk ... 12.40
Ton lots, packed ... 14.00

Ferroalloy Prices

Spiegel Eisen

Contract prices gross ton; lump, f.o.b.
 16-19% Mn 19-21% Mn
 1% max. Si 3% max. Si
 Palmerton, Pa. \$24.00 \$25.00
 Pgh. or Chicago \$4.00 \$5.00

Manganese Metal

Contract basis, 2 in. x down, cents per
 pound of metal, delivered.
 96% min. Mn, 0.2% max. C, 1% max.
 Si, 2.5% max. Fe.
 Carload, packed 36.95
 Ton lots 38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed
 east of Mississippi, cents per pound.
 Carloads 30.00
 Ton lots 32.00
 Less ton lots \$4.00 to \$7.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn con-
 tained, lump size, del'd Mn 85-90%.
 Carloads Ton Less
 0.07% max. C, 0.06%
 P, 90% Mn 28.45 30.30 31.50
 0.07% max. C 27.95 29.80 31.00
 0.15% max. C 27.45 29.30 30.50
 0.30% max. C 26.95 28.80 30.00
 0.50% max. C 26.45 28.30 29.50
 0.75% max. C, 80-85% Mn,
 5.0-7.0% Si 25.30 26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract
 price, carloads, lump, bulk, delivered, per
 lb of contained Mn 21.55¢

Silicomanganese

Contract basis, lump size, cents per
 pound of metal, delivered, 65-68% Mn,
 18-20% Si, 1.5% max. C. For 2% max. C,
 deduct 0.2¢.
 Carload bulk 11.40
 Ton lots 13.05
 Briquet, contract basis carlots, bulk
 delivered, per lb of briquet 12.65
 Ton lots, packed 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk,
 Iowa, or Wenatchee, Wash., \$95.00 gross
 ton, freight allowed to normal trade area.
 Si 15.01 to 15.50 pct, f.o.b. Niagara Falls,
 N. Y., \$93.00. Add \$1.00 per ton for each
 additional 0.50% Si up to and including
 17%. Add \$1.00 for each 0.50% Mn over
 1%.

Silicon Metal

Contract price, cents per pound con-
 tained Si, lump size, delivered, for ton lots
 packed.
 96% Si, 2% Fe 18.00
 97% Si, 1% Fe 18.50

Silicon Briquets

Contract price, cents per pound of
 briquet bulk, delivered, 40% Si, 2 lb Si
 briquets.
 Carloads, bulk 6.95
 Ton lots 8.55

Electric Ferrosilicon

Contract price, cents per pound con-
 tained Si, lump, bulk, carloads, delivered.
 25% Si 20.00 75% Si 14.20
 50% Si 12.40 85% Si 15.55
 90-95% Si 17.00

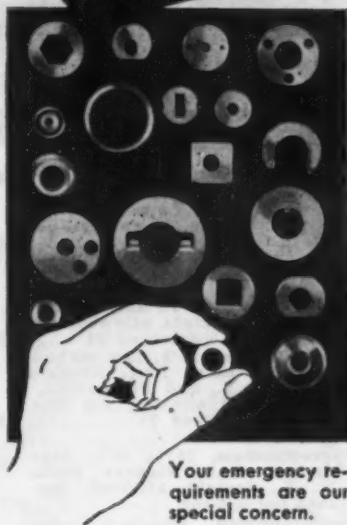
Calcium Metal

Eastern zone contract prices, cents per
 pound of metal, delivered.
 Cast Turnings Distilled
 Ton lots \$2.05 \$2.95 \$3.75
 Less ton lots 2.40 3.30 4.55

Ferrovanadium

35-55% contract basis, delivered,
 per pound, contained V.
 Openhearth \$3.00-\$3.10
 Crucible 3.10-3.20
 High speed steel (Primus) 3.20-3.25

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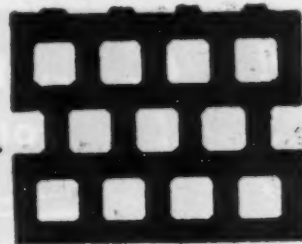
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CHICAGO 4, ILL. HOUSTON 2, TEX.

Ferroalloy Prices

Alsiifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carloads	9.90
Ton lots	11.30
Calcium molybdate, 46.3-46.6% f.o.b. Langloth, Pa., per pound contained Mo	\$1.15
Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.	
Ton lots	\$4.90
Less ton lots	4.95
Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C, Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	\$3.75
Ferromolybdenum, 55-75%, f.o.b. Langloth, Pa., per pound con- tained Mo	\$1.33
Ferrophosphorus, electrolytic, 23- 26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	\$75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Ni- agara Falls, N. Y., and Bridge- ville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.50
Less ton lots	1.55
Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, car- load per net ton	\$177.00
Ferrotungsten, standard, lump or 1/4 x down, packed, per pound contained W, ton lots, delivered	\$5.00
Molybdc oxide, briquets or cans, per lb contained Mo, f.o.b. Langloth, Pa.	\$1.14
bags, f.o.b. Washington, Pa., Langloth, Pa.	\$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium Pentoxide, 85-89% V ₂ O ₅ , contract basis, per pound contained V ₂ O ₅	\$1.23
Zirconium, 35-40%, contract ba- sis f.o.b. plant, freight al- lowed, per pound of alloy	
Ton lots	21.00¢
Zirconium, 12-15%, contract ba- sis, lump, delivered, per lb of alloy	
Carload, bulk	7.00¢
Boron Agents	
Boroall, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B	\$5.35
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed	
Ton lots, per pound	10.00¢
Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots	\$1.20
F.o.b. Wash., Pa.; 100 lb up	
10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over	
No. 1	\$1.00
No. 6	68¢
No. 79	50¢
Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd	
Ton lots	\$1.46
Less ton lots	1.57
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered	
Less ton lots	\$1.80
Silenz, contract basis, delivered	
Ton lots	45.00¢

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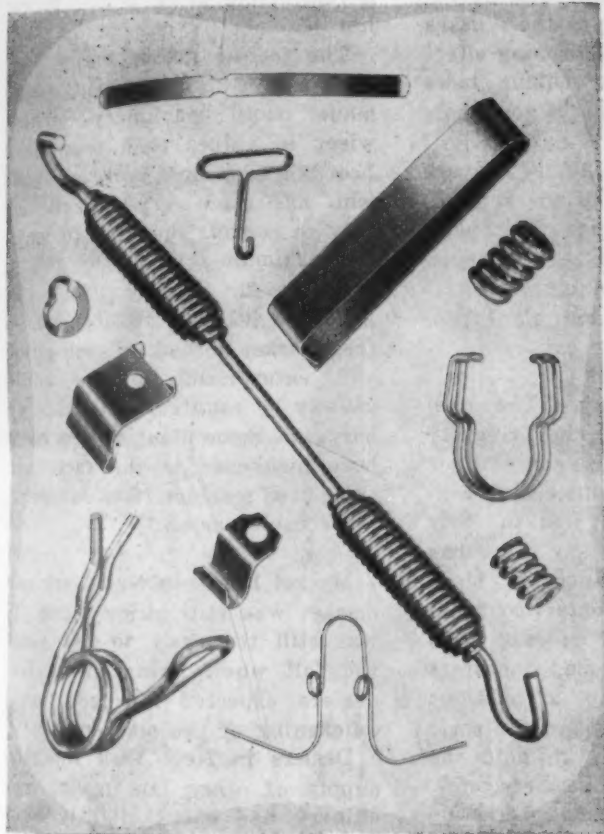
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GENERAL SPECIFICATIONS:

Capacity, Nominal: 100,000 lbs.

Light Weight App.: 44,000 lbs.

Load Limit: 125,000 lbs.

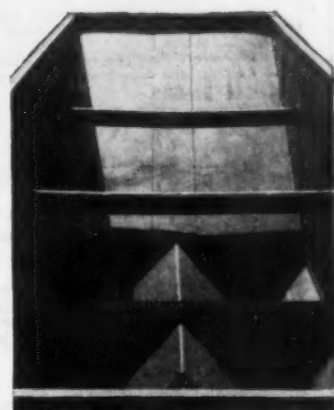
Length over strikings: 31'11"

Cubic Capacity, (with normal heap): 1,620 Cu. Ft.

Inside Width: 9'5-1/2"

Inside Length: 30'6"

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Hill Clutch & Machine & Fdy. Co. Open Side Abrasive Belt Grinding Unit. Designed to accommodate slabs up to $\frac{3}{4}$ " thick x 30" wide x 30' long.

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16' x $\frac{3}{4}$ " Drais & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

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6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Gasoline Engine, Rubber Tires.

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5 ton Niles Crane 56' 3 $\frac{3}{4}$ " Span. Three motors, 440 volt, 3 phase, 60 cycle.

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5 ton Whiting Two Leg Gantry Crane 52 Ft. Span Cab Control. Three Motors 220 v. 3 ph. 40 cy.

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$\frac{3}{4}$ " McCabe Pneumatic Flanging Machine, Pneumatic Hoistsdowns, Circle Flanging Attachment.

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5" Ajax Forging Machine or Upsetter, Motor driven. Equipped with Air Clutch.

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Surface Combustion Super Fast Heating Furnace Tangential Burner, 3 Section, Pusher Capacity 3600 lb. per hr. gross, Max. Temp. 2750° F. Complete Elec. Equip.

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400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.

15 ton Heroult Model Y-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.

25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 va. 3 ph. 40 cy.

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60" Aefna-Standard Roller Leveler, Motor Driven. 17 Rolls 4 $\frac{3}{4}$ " Dia.

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48" x 48" x 20' Cincinnati, Four Head

48" x 48" x 12' Niles-Bement-Pond, Four Head

60" x 60" x 12' Niles-Bement-Pond, Four Head

72" x 72" x 12' Niles-Bement-Pond, Four Head

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Type "B" Crown Full Automatic, Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

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1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2 $\frac{1}{2}$ " stroke, 18" Shut Height.

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8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.

12 $\frac{1}{2}$ " x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.

12" x 14" Waterbury Farrel Single Stand Two High. Complete with Gear Reducer and 50 H.P. A.C. Motor.

18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill. Complete with Elec. Equip.

STRAIGHTENERS

No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3 $\frac{1}{2}$ " Bars or 4 $\frac{1}{2}$ " O. D. Pipe or Tubing. NEW 1950.

No. 4 Kane Roach 8-Roll Straightener Capacities 2" Rounds or Squares, 3x3 $\frac{1}{2}$ " Angles, 2 $\frac{1}{2}$ " Channels, etc.

TESTING MACHINE

300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

TRIMMING LINE

#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys $\frac{1}{4}$ " max. Trimmed width 22" min. 46" max. Scrap Length $\frac{3}{4}$ " min. 2 $\frac{1}{4}$ " max.

UNIVERSAL IRONWORKERS

Ryerson Steel Frame Universal Iron Worker, M.D. Capacity Punch $\frac{1}{4}$ " thru $\frac{1}{2}$ " Shear 1" Square 1 $\frac{1}{4}$ " Round, $\frac{1}{2}$ " x 4" Flat, 4 x 4 x $\frac{1}{4}$ " Angles.

No. 28U-30 Buffalo Armor Plate Universal Ironworker—Combination Punch, Shear & Bar Cutter. Motor Driven Capacities—Shear 3" Round, 2 $\frac{1}{2}$ " Square, 5x1 $\frac{1}{2}$ " Flat, 5x5 $\frac{1}{2}$ " Angles, 12"—31 $\frac{1}{2}$ " Beams, etc., Punch 1 $\frac{1}{2}$ " thru 1 $\frac{3}{4}$ ".

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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Seasonal Uplift?—Now that the dog days are almost over, dealers in used and rebuilt machinery in Detroit as well as other industrial centers are looking forward — a little anxiously—to a seasonal uplift in September. Opinion here is that the market was far too placid during the summer.

The end of the vacation season for plants and manufacturing executives returning to their desks should have some loosening effect on the market by making more much-wanted but scarce good tools available.

Prospective machinery buyers who have ridden out the summer without buying may now hustle back into the market. It's hoped they are again thinking of revitalizing tool shops and plant production lines.

Problems Easing — The steel supply situation is clarifying for the manufacturer. He can now see his shortage problems easing considerably this year and in early 1953. Some dealers say there has been some reluctance by plant owners to inquire after used machinery when steel was apt to be in shortage. Other manufacturers have been playing a cautious hand, watching demand for their product and trying to hold the line on plant improvements, etc.

As consumer demand perks up they can be expected to be better customers for the used trade.

Late Model Scarcity — Dealers in Detroit expect September to be a better month than any since last spring. The market generally begins to revive at the start of September and strengthens in the fall and through December. Scarcity of late model machine tools continues to be a deterrent to sales, however.

What influences the used tool market in Detroit is annual model changeovers in auto plants. Both automakers and their suppliers logically need new and different tools for new cars. This forces

them into the market. At the same time they must place old tools on the market for sale, reconditioning, or rebuilding.

No Major Help—This is by no means major relief for the ills of today's Detroit market. The problem of getting those good, late model tools so much in demand at a reasonable price is the tallest hurdle.

The feeling among many dealers is that OPS price listings have made many machinery owners wiser in values than they have been in previous years. Anyone who has machinery to sell has only to consult the book to learn the maximum price he can get.

He starts at this point and yields as little as possible. On a free market he had no such guide and enterprising buyers could usually be counted on to pick up bargains. Some plant owners have been awakened to the fact that their used machine tools command respectable prices.

Market Idles—In New York the market was still idling along. It was still too early to tell what the fall would bring about but dealers expected the traditional quickening of the market.

Dealers in New York reported supply of other late model machinery had eased slightly over the months but that demand for vertical mills, power shears, power press brakes continues strong. These items are rare in the market and delivery time runs from 6 to 10 months.

Some of the demand heat has been taken off turret lathes. Sales of foreign tools have been easing. A 3000-ton press was reported sold in New York recently.

One dealer remarked that when new machine builders finally reached the point of normal delivery time, used machinery would lose one of its sales features—quick availability. Trade would continue with traditional customers—plants interested in economy.